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SET CHARACTERISTICS OF

CONCEPTUAL SYSTEMS

by



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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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## UNIVERSITY OF ALBERTA

## FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Set Characteristics of Conceptual Systems" submitted by Leonard L. Stewin in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

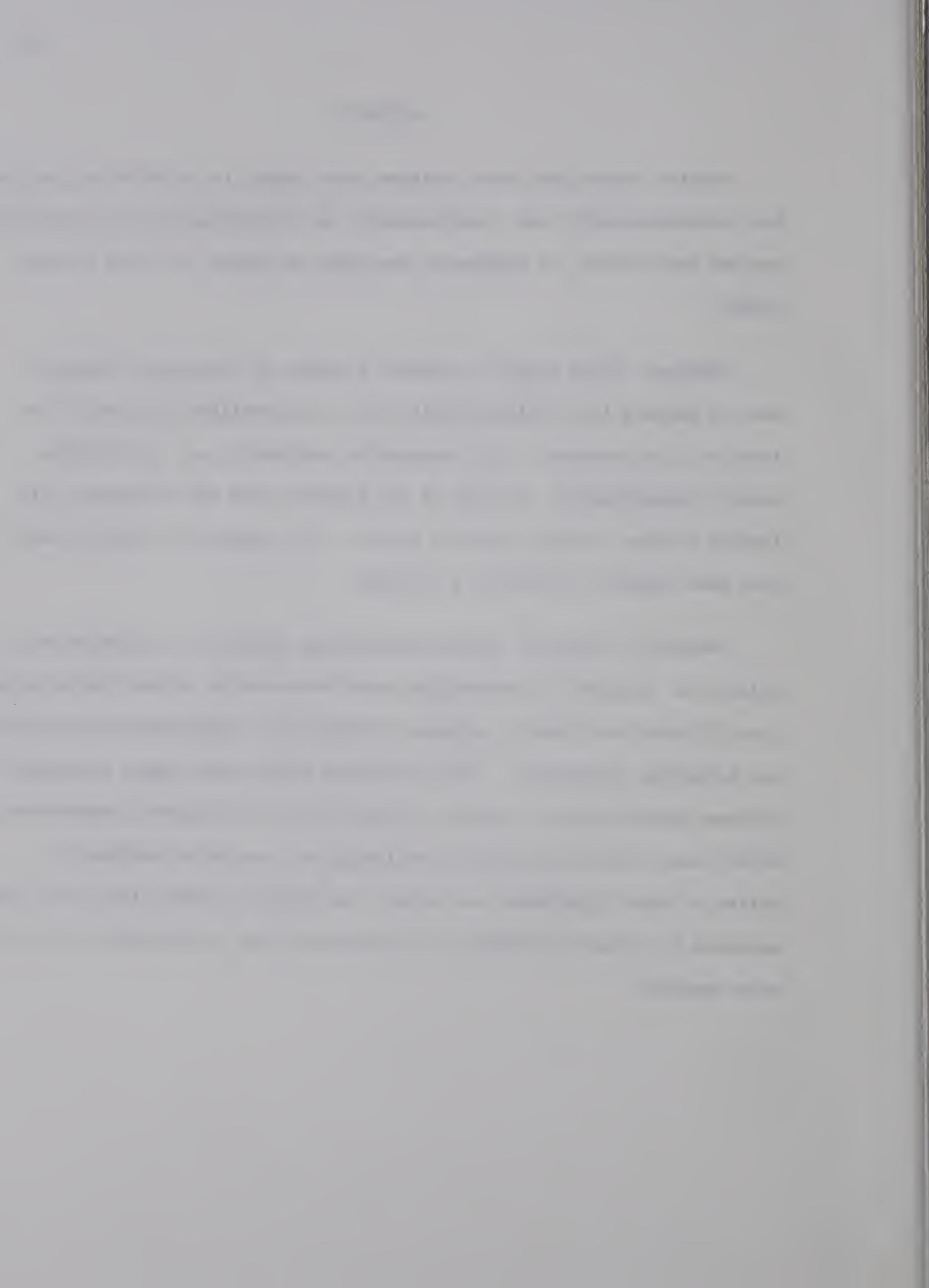


## ABSTRACT

Several researchers have developed what appear to be differing approaches, both psychometrically and theoretically, to the examination of conceptual systems functioning, as originally described by Harvey, Hunt and Schroder (1961).

Gardiner (1968) sought to examine a number of instruments commonly used to measure functioning of this sort, and identified two factors related to this construct: (a) integrative complexity and, (b) informational dimensionality. One aim of the present study was to examine this finding further, using a modified battery. The results of a factor match lent some support to Gardiner's findings.

Secondly, conceptual systems functioning appears to be theoretically related to a number of personality correlates such as certain characteristics of Soviet set theory, agreement response set, impulsivity-reflectivity and religious orientation. Factor analysis showed that higher conceptual systems functioning was related to flexibility and religious independence, while lower conceptual systems functioning was related to conformity. A series of minor hypotheses was tested, the results of which imply that some measures of conceptual systems functioning may best be conceived of as domain specific.



TO MY FATHER

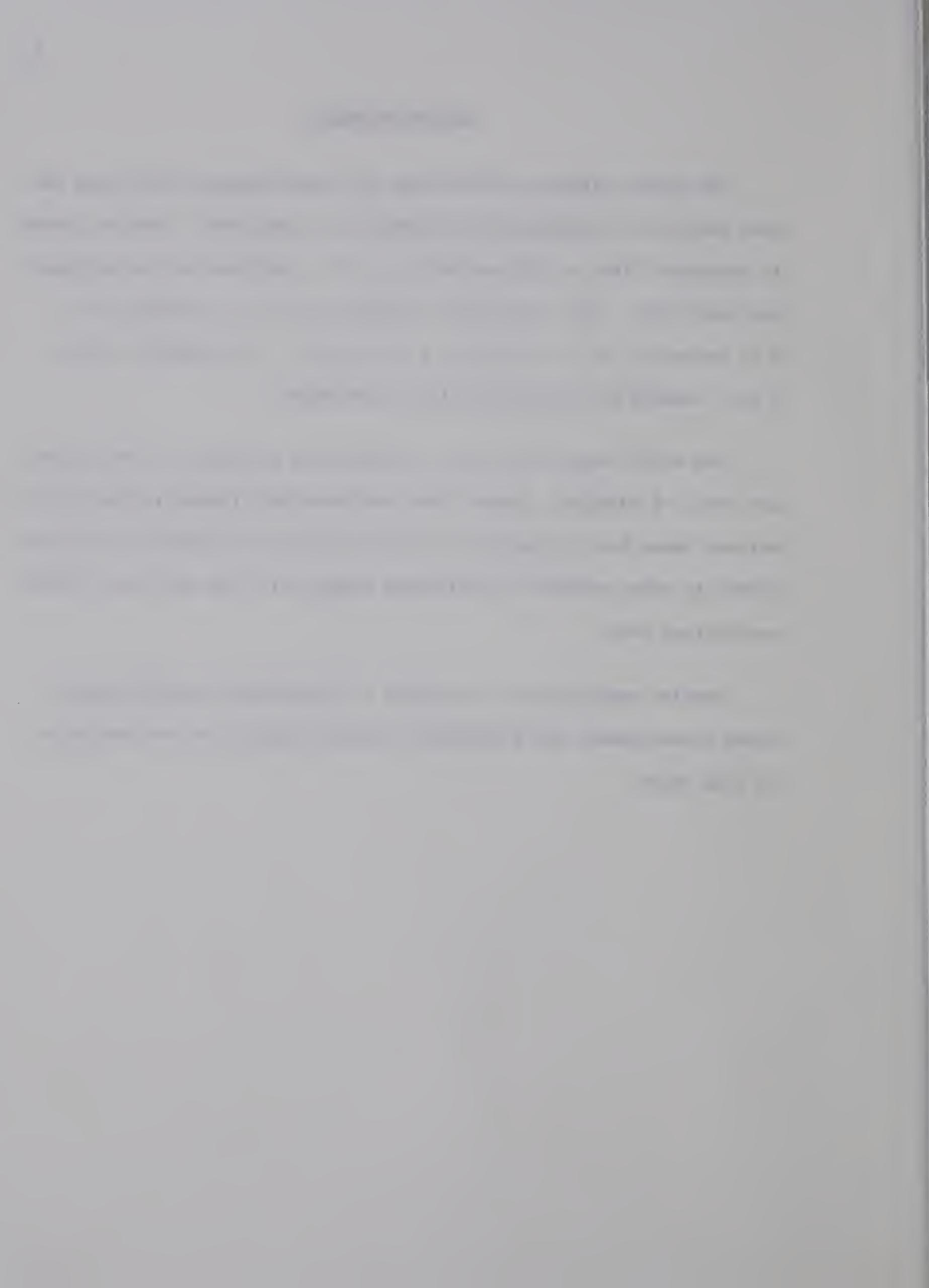


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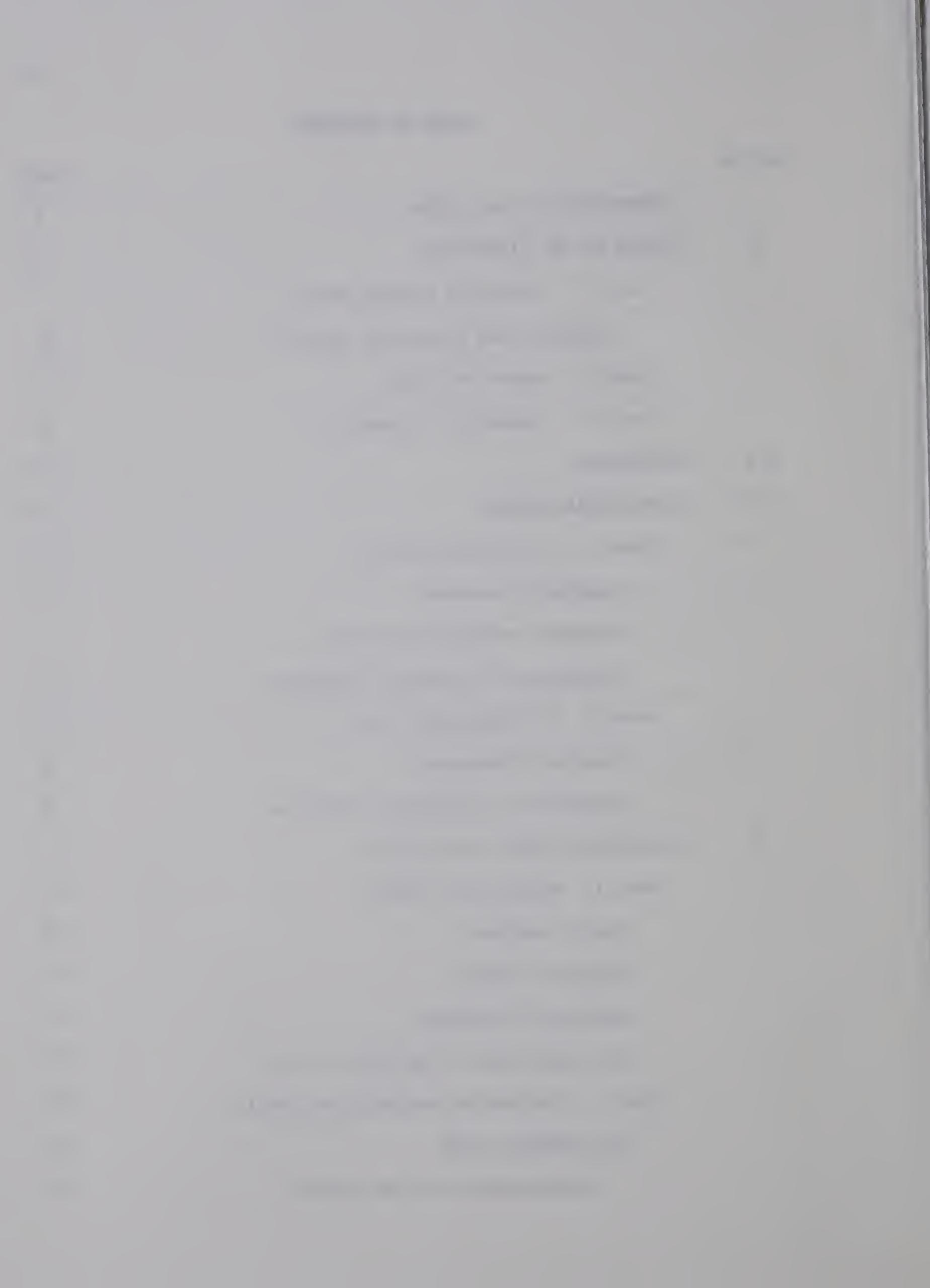
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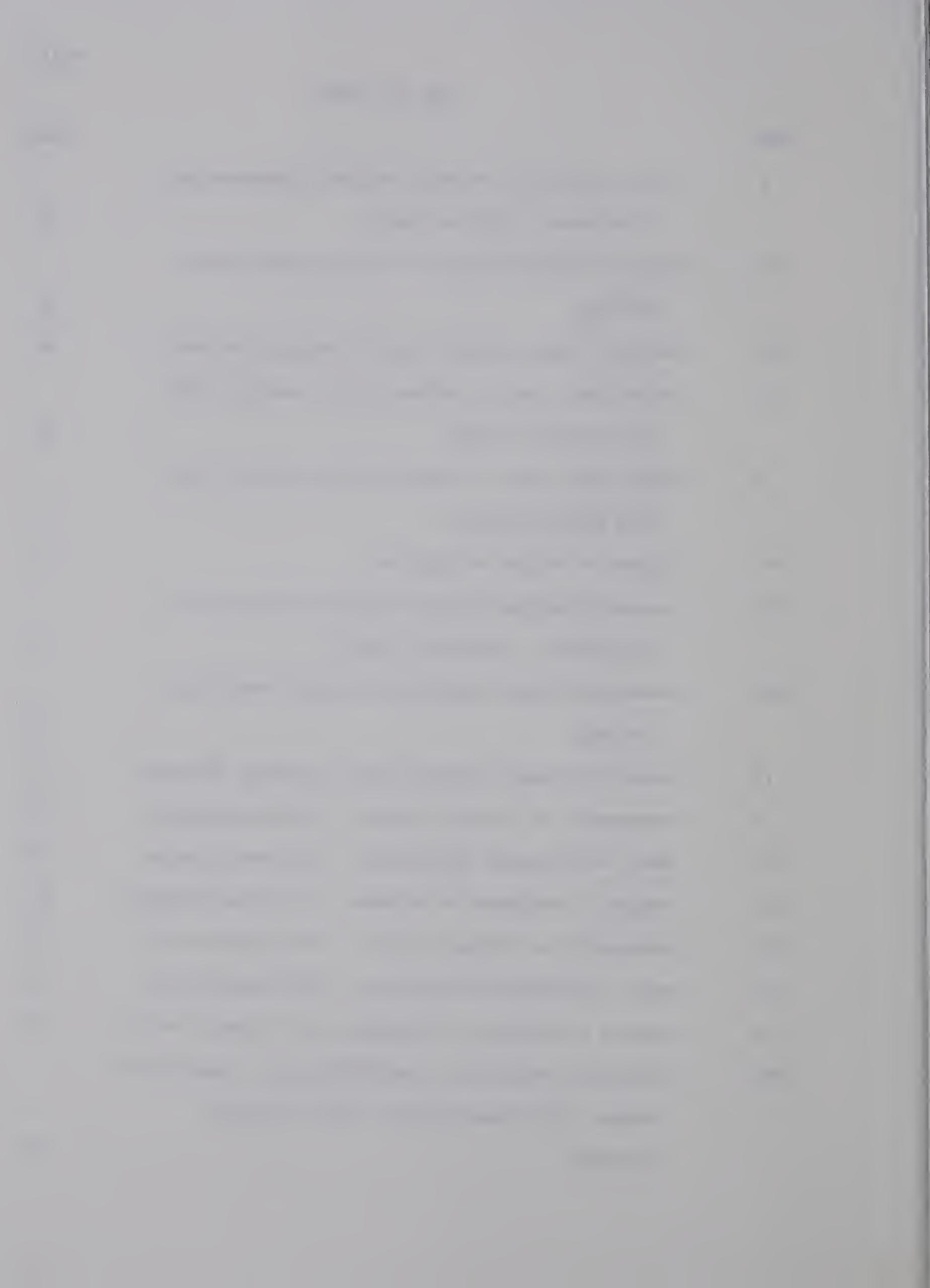
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## CHAPTER I

### INTRODUCTION TO THE STUDY

The original purpose of education has been to transmit the skills and values of a society (Wallerstein, 1969, p. 3). Contemporary education is strongly influenced by technology and the industrial state (Anderson, 1968). As a result, educational institutions have acquired assembly-line characteristics in their attempt to manufacture a uniform product. Students in this process are inculcated with a high dependence on external controls, low resistance to ambiguous situations, and a host of "sanctioned values" (Anderson, 1968, p. 10).

Several authors have stressed the need for change in contemporary education (Anderson, 1968; Brogan, 1960; Friedenberg, 1967; Getzels, 1957; Goodman, 1964, 1967; Hunt, 1966a). In a society identified with rapid transformation of structure and mores, the aim of education must be to prepare the individual to make reasonable value decisions on the basis of available information, and to supplant the now obsolete goal of enculturation.

An information processing model relevant to this need in education has been proposed by Harvey, Hunt, and Schroder (1961) and Schroder, Driver, and Streufert (1967). A simple description of this model, termed "conceptual systems theory", was presented by Harvey (1967). Level of conceptual systems functioning refers primarily to the complexity, or abstractness, of social judgments made by an individual. An individual's position along this concrete-abstract continuum is proposed to influence both his perception and interpretation of social stimuli.



Present-day educators are well acquainted with the concept of grouping students for instructional purposes. Recently Hunt (1966a, 1969a) and Hunt and Dopyera (1966) have utilized level of conceptual systems functioning as a criterion of grouping. This procedure ensures that each group, homogeneous in conceptual stage, is capable of assimilating subsequent material at its own level of complexity. Of course it is necessary that the past training of the group members be to some extent similar (Hunt, 1966, p. 297) so that instruction may be relevant and meaningful to each member of the group.

Schroder, Driver, and Streufert (1967) have concentrated on information processing as the critical determinant of level of conceptual systems functioning. Basic to this position is the assumption that an individual's level of information processing within a stimulus domain is

determined directly by three primary factors (information load, information diversity, rate of change of information) and influenced indirectly by several secondary factors (including success-failure, set and orientation...) (Suedfeld & Hagen, 1966, p. 233).

Although secondary factors do not influence the complexity of information presented, they affect the manner in which information is used by the individual (Schroder, Driver & Streufert, 1967, pp. 31-32).

Set in this context is conceived of as an orientation which may be specific to a domain, so that the individual's perception of the informational environment may be inadequate or in some cases inaccurate.

Although the term set is frequently employed in western psychological studies, no exact theoretical position is evident. Lack of a



unitary definition of set in the west has resulted in numerous empirical positions with regard to the nature of set (Freeman, 1940; Hritzuk, 1968). In contrast, Soviet research on set has been guided, since its initial phases, by the formulations of Uznadze (1966). As a result of this direction, Soviet work in the area is better integrated and more unitary than that being attempted in the west. For these reasons the Soviet theoretical position will be incorporated into this study.

The school of psychology founded by Uznadze tends to conceive of set as a condition of the organism which disposes an individual to respond in a particular direction (Prangishvili, 1962; Uznadze, 1966). This concept differs from that held by most western psychologists in that Uznadze describes set as the central determinant of behavior, while western psychologists consider set usually in conjunction with a specific task or situation (Luchins, 1942). The centralistic position given to set in the Soviet tradition is most clearly exemplified by Khojava who states

behavior does not begin from a "blank" and does not start immediately after the stimulus; it is always preceded by a definite state of the subject (set); being a state of readiness ... to accomplish the given behavioral act, it mediates and determines the realization of the set (1966, p. 80).

Set in the Uznadze tradition is conceptualized as being the basic mechanism from which the personality develops. Individual sets may be identified by their properties. The key measures from which these properties are derived are (a) the excitability of set, or the number of trials required to establish the set, and (b) the extinction of set, or the number of trials required to irradicate the set. Uznadze



(1966) noted three successive phases to set extinction.

Set is considered by Schroder et al. (1967) to be a secondary property of complexity, in terms of its effect on information processing. Various studies which purport to examine change of set and conceptual systems functioning have been summarized by Harvey (1966, pp. 54-56). More complex individuals appear to be less affected by set than do less complex individuals. Generally, significant differences in flexibility of set were found between individuals of higher conceptual systems and those of lower conceptual systems.

One of the purposes of the present study is to examine the Soviet concept of set in relation to conceptual systems functioning. Harvey, Hunt and Schroder (1961) postulated a number of global cognitive traits associated with conceptual systems functioning. One such trait is dependence on authorities, which lessens as the individual attains higher levels of functioning. Harvey (1966) has emphasized religious behavior to assess the individual's reliance on external controls and has, in particular, stressed concensus with religious dogma as a characteristic of the lowest level of functioning. Allport and Ross (1967) have objectively described three aspects of religious behavior, termed intrinsic religious orientation, extrinsic religious orientation, and indiscriminately pro-religious thinking. Following Harvey's emphasis, these three religious behaviors will be considered in relation to conceptual systems functioning.

Harvey (1966, p. 49) suggests that frequency of church attendance varies between conceptual systems. This aspect of religious behavior



will also be of concern in the present study.

Variability in some aspects of decision making has been considered by Lanzetta (1963) who found individual differences in the amounts of time and information utilized. Sieber and Lanzetta (1964) found that subjects with more complex conceptual structures require both more time and more information before reaching a decision than do less complex individuals. Extensive research into response time or latency has been conducted by Kagan (1965a, 1965b, 1965c, 1966; Kagan, Pearson, & Welch, 1966; Kagan, Rosman, Day, Albert, & Phillips, 1964; Yando & Kagan, 1968). Kagan noted that children varied in both latency and error scores on a visual discrimination task (Matching Familiar Figures). He described their approaches as either reflective or impulsive. Reflectivity is operationally defined in terms of a longer latency and fewer errors; impulsivity is distinguished by shorter latency and more errors.

Sieber and Lanzetta (1966) agree with Kagan et al. (1964) that period of latency is determined by the number of alternative responses considered by the individual in the process of making a decision. In terms of conceptual systems theory the reflective individual is processing more information because of his awareness of more relationships. He would therefore be expected to be functioning at a higher level of complexity than an impulsive person.

Differences in information processing were also examined by Couch and Keniston (1960) in their study of acquiescent set. They defined two groups of subjects; yeasayers or stimulus acceptors were distinguished from naysayers or stimulus rejectors on a measure of agreement response



set. Shaw (1968) p. 36 suggests that, as information processing styles, these patterns may be viewed as correlates of conceptual systems functioning. Such a response tendency, being independent of specific content, is suggested to be an emotional impulsivity-control dimension rather than an intellectual factor (Couch & Keniston, 1960, p. 156). Schroder, Driver, and Streufert (1967, p. 126) indicate that such categorical attitudes are related to concrete rather than abstract levels of functioning. They also hypothesize (*ibid.*, p. 105) that emotional responses tend to be related to concrete functioning. This implication will also be further investigated.

The present study is designed to investigate the relationships which appear to exist among the personality models described by the following theorists: (a) Harvey, Hunt, and Schroder (1961) and Schroder, Driver, and Streufert (1967); (b) Uznadze (1966); (c) Allport and Ross (1967); (d) Kagan et al. (1964); (e) Couch and Keniston (1960).



## CHAPTER II

### REVIEW OF THE LITERATURE

#### PART 1

#### CONCEPTUAL SYSTEMS THEORY

Conceptual systems theory originated in the broader field of concept formation (Goldstein & Scheerer, 1941; Heidbreder, 1946, 1948, 1949; Hull, 1920). Kelly (1955) coined the term "constructs" in reference to individual patterns of interpersonal perception. Working from Kelly's theoretical framework, Bieri (1955) developed the concept of cognitive complexity as an "information processing variable which enables us to predict how an individual transforms specified social stimuli into kinds of social or clinical judgments (Bieri, 1966, p. 15)." He defined cognitive complexity as the

tendency to construe social behavior in a multidimensional way, such that a more cognitively complex individual has available a more versatile system for perceiving the behavior of others than does a less cognitively complex person (Bieri, 1966, p. 14).

In Bieri's view, cognitive complexity is the result of either a great number of dimensions or a great number of differentiations upon dimensions along which the social environment may be perceived.

Harvey, Hunt, and Schroder (1961) incorporated Bieri's conceptualization of cognitive complexity into conceptual systems theory. Harvey et al. (1961) tend to emphasize the integrative functioning associated with complexity levels, rather than the differential aspects. As Harvey states,

Concreteness-abstractness, as we have characterised and validated the construct refers to a superordinate conceptual dimension encompassing such more molecular organizational properties as the degree of differentiation, articulation, integration, and centrality of the cognitive elements (1967, p. 205).



Harvey et al. (1961) postulate a developmental sequence of complexity along a concrete-abstract continuum which bears some resemblance to the models postulated by Piaget (1932, 1950) and Vygotsky (1966). The individual's progress along the concrete-abstract continuum is governed by "environmental conditions which facilitate openness to the discrepant conceptual orderings or differentiations required for progression (Harvey et. al., 1961, p. 87)." Development of increasingly abstract conceptual systems is sequential; however, arrestation can occur. Arrestation at a particular stage through detrimental environmental conditions determines the individual's maximal level of conceptual systems functioning.

Harvey, Hunt and Schroder (1961, pp. 85-112) have identified four major systems of functioning along the concrete-abstract dimension. Cognitive functioning of individuals at each of these stages is described below.

SYSTEM I: The individual is characterized by the orientation of structuring the environment in terms of absolutes. He adheres to externally imposed criteria, relies on given material, and tends to interpret the environment in a black-white categorical manner. The individual has high positive ties with, and dependence on, representatives of, particularly, institutional authority and religion.

SYSTEM II: The individual is characterized by the ability to distinguish between externally imposed criteria and internal standards. He is governed by an avoidance and rejection of social prescriptions and an avoidance of dependency on religion. The individual is negatively oriented toward social



objects.

SYSTEM III: The individual is characterized by the ability to objectify and approach problems empirically. He is oriented toward establishing and maintaining intragroup concensus as a step toward dependency and control of others.

SYSTEM IV: The individual is characterized by maximally abstract functioning. His power of differentiation is highly developed. He is more oriented toward information seeking and problem solving for intrinsic rather than extrinsic rewards.

The conceptual systems level manifested by the individual is primarily dependent on the degree of differentiation and integration of stimuli evident, and is displayed in cognitive, affective, and behavioral characteristics. The following characteristics appear related to lower system functioning (Harvey, 1967, pp. 206-207; Harvey & Ware, 1967, p. 277):

- (a) a greater tendency toward categorical thinking,
- (b) a greater dependency on status and authority as guidelines,
- (c) a greater intolerance of ambiguity as measured by the F scale and Dogmatism scale,
- (d) a greater need for cognitive consistency and lessening of cognitive dissonance,
- (e) a lesser ability to change set, a greater stereotyping in solution of complex problems,
- (f) a greater tendency to hold opinions with certainty,
- (g) a greater tendency to form generalized opinions without complete information.



Various measures have been developed to assess the individual's level of complexity within the domain of interpersonal perception. Each measure tends to reflect the approach of a particular researcher to the study of conceptual systems. Since their 1961 publication, Harvey and Hunt appear to have concentrated on training agents (environmental conditions) and behaviors characteristic of each conceptual system level (Harvey, 1967; Harvey, Prather, White, & Hoffmeister, 1968; Hunt, 1966a; Hunt & Joyce, 1967), while Schroder has emphasized information processing in his approach to conceptual systems' functioning (Schroder, Driver, & Streufert, 1967). Differences in approach are again reflected in instrumentation. Schroder and Streufert (1962) and Harvey (1964, 1965) have utilized semi-projective tests with satisfactory results. Objective measures have more recently been constructed by Tuckman (1966) and Harvey (1967).

Differences in approach to conceptual systems theory have resulted in the development of multiple classificatory schema. Schroder et al. (1967, p. 3) emphasize information and the use of information, stressing the manner in which an individual combines and relates the information at his disposal. This aspect of functioning is indicative of level of "integrative complexity". The abilities of humans to be less stimulus bound than animals, to generate more alternatives, and to interrelate multiple stimuli via combinatorial rules (Schroder et al., 1967, p. 5) give rise to behavior of high adaptive value (Gardiner, 1968, p. 26)\*. Schroder, Driver, and Streufert (1967) state that degree of integrative complexity is dependent on both the informational dimensions (content) and the integrating rules (structure) which are operational. The

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\* The nature of rules basic to integrative functioning is discussed by Bower (1969).



integration of these two factors determines the level of integrative complexity. Although the number of dimensions is not necessarily related to the integrative complexity of the individual, the probability of more complex combinatorial rules increases with a greater number of available dimensions. Dimensionality is therefore a secondary property of integrative complexity. Schroder et al. (1967) label combinatorial capacity as the "integration index" which increases as one proceeds along the concrete-abstract continuum.

Certain modes of processing information result in typical patterns of behavior. As noted earlier, Harvey et al. (1961) describe behaviors characteristic of various systems. Schroder et al. (1967, pp. 14-29) denote four types of integrative structures (low, moderately-low, moderately-high, high).

A high integrative index is associated with more degrees of freedom in the integrative process, less certainty, and the ability to generate and apply laws in organizing large bodies of information. Behavioral patterns generated by a high integrative index include a theoretical outlook, greater capacity to deal with diversity, greater discrimination, and increasing potential for generation of new schemata without new external conditions.

Level of conceptual system functioning and level of integrative complexity appear synonymous. However, differences in approach to the classification of individuals by each schema have resulted in differing bases of categorization. Most studies attempting to define a common factor of complexity among various measures have resulted in negative findings (Gardner & Schoen, 1962; Scott, 1962, 1963; Vannoy, 1965).



However, Gardiner (1968) identified three factors in a battery of conceptual systems measures and correlates which he termed an integrative complexity factor, a religious rejection factor, and a cognitive differentiation factor. Gardiner (1968) devised novel scoring procedures for several instruments which have particular relevance as his results oppose those of other researchers considering the problem.

Despite variations in emphasis, Harvey, Hunt, and Schroder remain concerned with environmental effects on developing complexity. The role of the teacher, parent, or other training agent, in promoting optimum complexity, appears to involve structuring the environment in the Brunerian sense (Bruner, 1966). Schroder and Harvey (1963) note that environments which are either overly simple or overly complex may cause arrestation of development along the concrete-abstract continuum. Schroder, Driver, and Streufert (1967, pp. 29-43) postulate a series of inverted U shaped relationships between environmental complexity and level of information processing illustrative of the influence of environment upon the development of integrative complexity. This curvilinear relationship is not unlike that postulated by Hebb (1966) to illustrate the influence of arousal level on performance.

Schroder et al. (1967) have described two antithetical sets of environmental conditions or training environments and their effects on conceptual systems development. The training environments are designated as (a) unilateral or deductive and (b) interdependent or inductive. In a unilateral training environment the individual learns by conformity to rules; he acquires the required responses to external controls through reward and punishment. Schroder et al. note that,



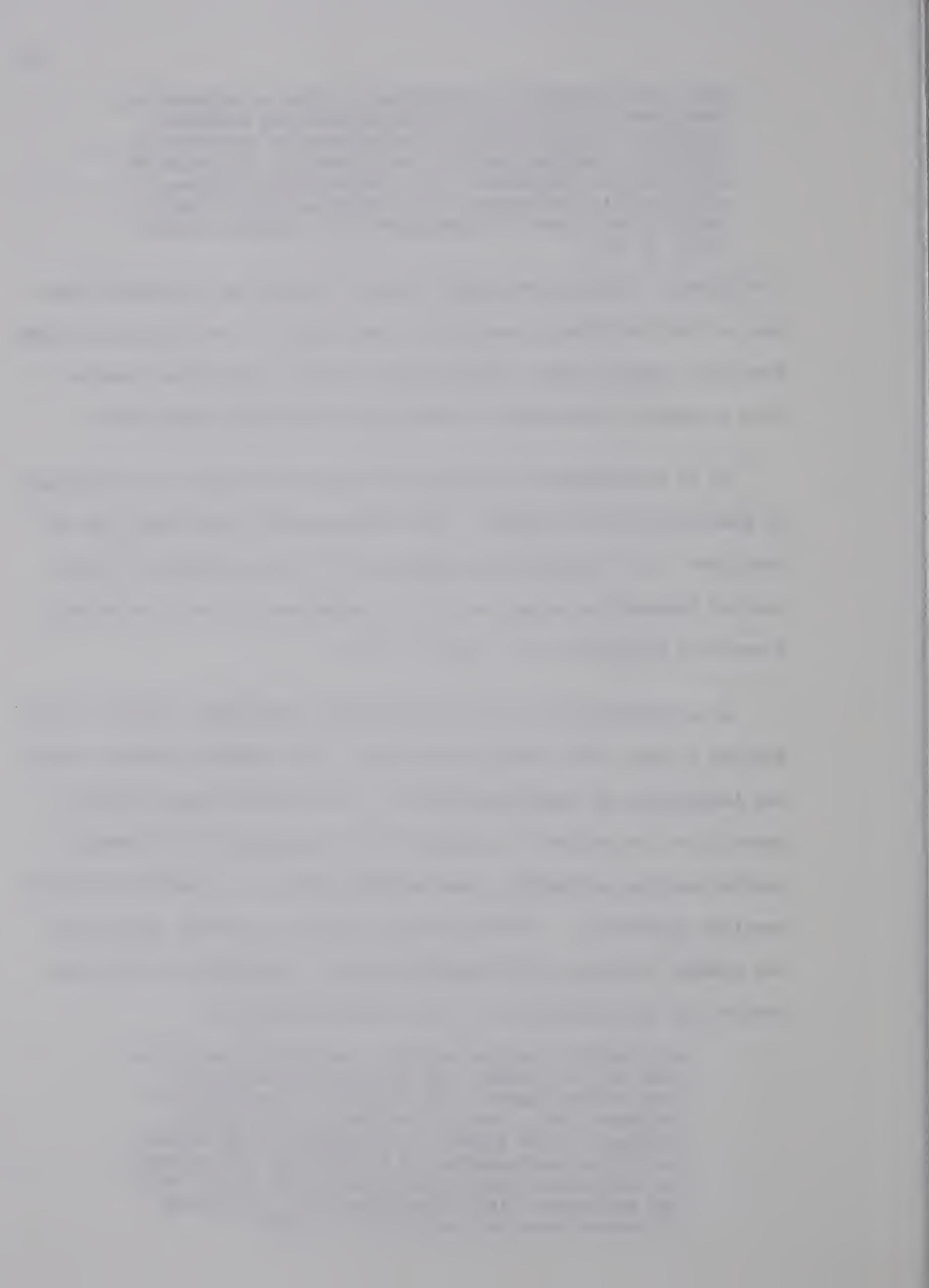
When the environment is simplified so that an organism is restricted in the variety of perceptions and responses available, the development of more abstract structure is hindered. Teaching methods that proceed by (a) analyzing the task into components, (b) teaching each component singly and in the absence of interfering factors, and (c) teaching the rules of integration have a similar effect (1967, p. 47).

A unilateral training environment tends to arrest the conceptual structure of the individual prematurely, resulting in a low integrative index. Similarly, Harvey (1966) contends that System I functioning results from a learning environment of restricted exploratory opportunity.

In an interdependent training environment the subject is encouraged to generate rules for himself. The interdependent environment has two functions: (a) to provide the potential for the utilization of more complex integrative rules, and (b) to encourage the use of alternate dimensions (Schroder et al., 1967, p. 49).

As an illustration of an interdependent environment, Karlins (1967; Karlins & Lamm, 1967; Karlins & Schroder, 1967) employed computer assisted instruction in experimental work. The teaching program provided material to the student in a manner which encouraged him to generate problem solving strategies, based on his ability to integrate previously acquired information. Information was stored on computer cards which the student obtained by the inquiry method. Karlins and Schroder summarized the characteristics of this teaching program as

- (a) flexible teaching pattern: the student determines what will be taught (and when) by his pattern of information request;
- (b) flexible responsive environment that provides feedback to the learner relevant to his inputs;
- (c) demands on the student for active manipulation of information;
- (d) emphasis on interactive connections between the student and the environment he is investigating;
- (e) storage of factual material only (1967, p. 868).



The emphasis on inductive reasoning characteristic of an interdependent training environment demands that the learner must establish, within himself, a means of evaluating his decisions via their conformity to the demands of the environment rather than by conformity to external controls. The key variable in this teaching environment is the inquiry approach stressed by Postman (1969).

The dichotomous training environments described by Schroder et al. (1967) represent terminal points on a continuum of such environments and, as such, constitute a theoretical model of conditions which would be closely associated with the extremes of functioning on the corresponding conceptual systems continuum (Schroder, et al., 1967, p. 50).

#### Correlates of conceptual systems

Globally, System I functioning (Harvey, 1966, p. 44) is associated with "high absolutism and closedness of beliefs" and "high positive dependence on representatives of institutional authority"; System II individuals exhibit (p. 45) "a high drive toward autonomy and avoidance of dependence on God"; a System III individual (p. 45) develops "fairly high skills in effecting desired outcomes in his world through the techniques of having others do it for him"; System IV individuals (p. 46) are characterized by "internal standards that are more truly independent of external criteria, in some cases coinciding with social definitions and in others not."

Harvey (1967) appears to rely heavily on religious dogmatism as an index of functioning on the Conceptual Systems Test. He notes (1966, p. 48) that religion consistently distinguishes between the four systems. The relationship between religious belief and conceptual systems function-



ing is not a linear one; that is, religious behaviors do not diminish progressively with increasing complexity. Harvey states that

System I individuals are the most religious, followed by Systems III, IV, and II, in that order. While persons from both System II and System IV tend to be low in religious beliefs or participation, System II individuals, far more than representatives of System IV, are likely to express a negative attitude toward religion and things associated with it (1966, p. 49).

Religious behaviors have been viewed by Allport and Ross (1967) in terms of the religious orientation of the individual. They have distinguished between intrinsic and extrinsic religious motivations. An intrinsic orientation implies an internalization of religious beliefs; religion is frequently the "master motive" in the lives of these individuals (Allport & Ross, 1967, p. 434). An extrinsic religious orientation is characterized by the use of religion to serve other purposes. Individuals so motivated appear religious to fulfil primarily social or self needs and their beliefs are either "lightly held or else selectively shaped to fit more primary needs (*ibid.*)."

These characteristics would appear harmonious with those traits previously ascribed to System I and System III functioning respectively.

Allport and Ross (1967, p. 437) have also described a response pattern termed indiscriminately pro-religious thought, in which individuals agree with both intrinsic and extrinsic religious items. This pattern of agreement, lacking in evaluation of specific content, would appear more characteristic of lower system functioning. Allport and Ross (1967, p. 441) state that indiscriminately pro-religious church attenders are significantly more prejudiced than individuals classified as either intrinsically or extrinsically oriented toward religion. Harvey (1966, p. 49) found System I individuals to exhibit



both high dogmatism and high authoritarianism. These findings suggest that indiscriminately pro-religious responses may be characteristic of, particularly, System I functioning.

In considering overt religious behaviors, Harvey notes that

Representatives of System II and IV rarely, for any reason, attend church. System II individuals more rarely than System IV, while System III persons tend to attend only on special occasions and System I individuals to attend once or more each week (1966, pp. 48-49).

Church attendance as obtained on the Allport and Ross (1967) scale will be related to conceptual systems functioning in conjunction with religious orientations. It is suggested that an intrinsic religious orientation, serving a primary rather than secondary need of the individual, will be reflected in higher church attendance, supporting Harvey's (1966) findings.

Recent studies (Harvey, 1967; Harvey & Ware, 1967; Sieber & Lanzetta, 1966) have empirically established some correlates of conceptual systems functioning. Sieber and Lanzetta note that "persons with complex conceptual structures took more time before reacting ... than structurally simple persons (1966, p. 561)." Sieber and Lanzetta (1966) attribute differences in latency to the number of alternative solutions which the individual considers before making an overt response.

Latency is also the critical variable utilized by Kagan, Rosman, Day, Albert, and Phillips (1964) in their research on individual differences in information processing. Kagan et al. (1964) described a response latency variable termed reflection-impulsivity. Reflection is defined as "the consideration of alternative solution hypotheses (either classification or problem-solving sequences) when many alternatives are



available simultaneously (Kagan et al., 1964, p. 33)." A second major problem solving variable, recognition errors, was identified and found to be related to verbal ability (*ibid.*), whereas latency was found to be independent of verbal skills. Kagan et al. (1964, p. 35) also note that impulsivity of response may, in many problem solving situations, lead to error and increasing anxiety, causing the individual to "gradually withdraw involvement from problem situations and become apathetic or hostile toward intellectual situations."

Categorization by this schema is bipolar: impulsive individuals are those whose response latencies are below the median and response errors are above the median; reflective individuals remain above the response latency median and below the response error median.

Kagan (1966, p. 18) notes that the relationship of impulsivity-reflectivity to accuracy of performance is evident only in situations which generate response uncertainty. Kagan, Pearson, and Welch (1966, p. 583) suggest that the impulsive child, in these situations, appears minimally concerned about errors and consequently makes decisions quickly; the reflective child apparently wishes to avoid errors and inhibits his impulsive responses.

Individual differences in time taken to evaluate a solution hypothesis touch the problem-solving process in two places; (a) selection of a solution hypothesis to act upon and (b) evaluation of the quality of the solution obtained (Kagan et al., 1966, p. 583).

Therefore, reflectivity is associated with both the generation of multiple hypotheses prior to responding, and the consideration of the relative merits of these hypotheses prior to overt response (Kagan, 1965b, p. 159). Impulsivity is associated with selection of the first solution hypothesis with minimal consideration of its appropriateness to the task.



These postulates, in conjunction with the findings of Sieber and Lanzetta (1966), suggest that the dimension of impulsivity-reflectivity to some extent parallels that of conceptual systems functioning in its emphasis on information processing. Schroder et al. (1967) tend to view increasing complexity in terms of generation and integration of multiple stimuli. This perspective implies that reflective individuals, through their emphasis on evaluation rather than impulse, might be expected to exhibit greater complexity than would impulsive individuals.

A second personality dimension related to information processing has been proposed by Couch and Keniston (1960). Beginning with the work of Jackson and Messick (1958), Couch and Keniston studied the problem of "agreeing response set," as a personal style. Individuals at either extreme of this dimension are termed yeasayers or naysayers. Yeaayers are described as exhibiting little control of their impulses, actively seeking change, showing little concern for evaluation, and responding quickly to both internal and external stimuli (Couch & Keniston, 1960, p. 163). At the other extreme, Couch and Keniston describe naysayers as controlling their impulses, maintaining inner equilibrium, and delaying and transforming impulses before they are expressed. "Both internal and external stimuli that demand response are carefully scrutinized and evaluated (Couch & Keniston, 1960, p. 164)."

Couch and Keniston (1960, p. 156) suggest that agreement response set appears to overlay a dimension of emotional impulsivity-control. Agreeing response tendency shows no relationship with "pure" authoritarianism, a low positive relationship with social acquiescence, and a moderate relationship with dogmatism. Couch and Keniston (1960, p.



159) suggest that the yeasayer "seeks dependency on external figures for support; yet is distrustful and anxious concerning these relationships." They conceptualize agreement response set as a dimension of emotional responsiveness. Yeasayers exhibit

a tendency to enjoy and yield to immediate, situational, short-term forces of both an internal and external nature. The central theme of the naysaying position is the effort to control and minimize internal and external forces seeking expression (Couch & Keniston, 1960, pp. 160-161).

Couch and Keniston (1960, p. 152) suggest that agreement response set is a measure of the tendency of the individual to either agree or disagree with items regardless of content. Harvey (1966) and Harvey and Ware (1967) found that lower systems functioning is related to lack of ability to change set or to stereotyped response patterns in complex problem situations. Although the response patterns described by Couch and Keniston are not synonymous with those being considered by Harvey, stereotyped behaviors appear to be manifested in both instances. Accordingly, it is feasible to postulate that both yeasayers and naysayers would exhibit lower conceptual systems functioning.

Harvey (1966) notes that System I functioning tends toward high identification and dependence while System II individuals seek autonomy, "guided more by rebellion against social prescriptions than by positive adherence to personally derived standards (Harvey, 1966, p. 45)." As agreement response set is conceptualized as an emotional, rather than intellectual, dimension, it may be thought to be more closely associated with lower, rather than higher, levels of complexity. It is hypothesized that emotional acceptance, exhibited by the yeasayer, may be related to System I functioning, while emotional rejection, characteristic of the naysayer, may be associated with System II



functioning. Schroder, Driver, and Streufert (1967), pp. 130-134) lend some support to this suggestion, noting a significant relationship between acquiescence and integrative simplicity (Hunt, 1962) and between overgeneralized negativity and concrete structure (Streufert, 1966). They caution, however, that no necessary relationship exists between complexity level and any other cognitive style because of the effects of situational variables operating in the two regions of functioning.

The personality patterns described by Allport and Ross (1967), Kagan et al. (1964), and Couch and Keniston (1960) may be perceived as global "sets" to domains. As utilized by Schroder, Driver, and Streufert (1967, p. 31), set is a secondary property affecting information processing, exerting its influence on "the way in which the person perceives or reacts to the task or goal by reducing or enhancing the richness of the informational environment (Schroder et al, 1967, p. 32)." In contrast, Uznadze (1966) perceives set as ordering both perception and reaction, and directing performance throughout the task. Set in this context is a primary aspect of the individual's behavior. Although set has been the subject of extensive Soviet research over the past forty-five years, few studies have been available in English translation. Consequently, little western research has utilized the Soviet concept of set (Côté, 1968; Hertzog, 1967; Hritzuk, 1968; Sodhi, 1968). Recent translations of Uznadze's theory (Hritzuk, 1968; Uznadze, 1966) make work in the area now feasible.

As conceptual systems' functioning is hypothesized to exercise a controlling influence on the behavior of an individual, at least



within a specific domain, it would appear to bear some resemblance to the effect exerted by set as defined by Uznadze (1966). In both instances the constructs under consideration are seen as either constricting or enhancing the individual's perception in a particular situation through their influence on information processing activities. Prior to examining this function of set further, some consideration of the Soviet theory of set appears appropriate.



## PART 2

## SOVIET SET THEORY

The general postulate underlying set theory according to Uznadze is given below.

For any phenomenon of behavior to appear, it must be assumed that a living being, with the ability of primitive perception and some form of activated need capable of being satisfied in these environmental conditions, develops a relationship with this environment on the basis of the integral state of the set arising in the subject, which leads him to perform purposive actions (Uznadze, 1966, p. 209).

Smirnov (1966, p. 16) points out that in the Soviet tradition it is the total organism "not his separate psychological acts that engage in active relations with reality." Set theory places the emphasis on the individual as the center of psychological investigation. Smirnov (1966, p. 17) notes that the set of the individual is a "necessary link between the environment and psychological functions." This link develops as the result of a 'need', which Uznadze (1966, p. 24) defines as "any state of the psychophysical organism which, requiring changes in the surrounding medium, gives impulse to the activity required for this purpose."

Uznadze distinguishes two major types of needs: (a) substantive needs, which require something substantial for their satisfaction, e.g., a hunger need, and (b) functional needs, which require only activity on the part of the organism for their satisfaction, e.g., epistemic curiosity (Berlyne, 1960, 1966). In addition, cognitive needs arise in humans during the fulfilment of substantive needs (Uznadze, 1966, p. 26).

The secondary necessary condition for the development of a set is



a situation in which the need can be satisfied. This need satisfaction complex is similar to the concept of a determining tendency postulated by Ach (Vygotsky, 1966, p. 54) and subsequently utilized by Lewin (1936).

Through interaction with the environment, the organism comes to associate certain cues with certain response patterns which have had fortuitous consequences under similar past circumstances; that is, needs have been satisfied. In this way, the organism develops a tendency, or set, to react in certain established patterns under certain conditions.

Studies carried out by Uznadze and his co-workers have indicated that lower animals are also under the control of sets (Uznadze, 1966, pp. 93-106). The needs and situations for need satisfaction play identical roles in both man and animal, and in both cases constitute the necessary conditions for a set. The major difference between man and animal is that the animal is unaware that he is an object existing in his environment, while man is aware of his autonomy through his ability to objectify the situation.

It is in this connection that the Pavlovian concept of a first and second signal system has relevance to set theory. Uznadze views human behavior as functioning on two levels (Hritzuk, 1968, p. 13). On the first level man is stimulus bound, responding directly to a given situation (controlled by the first signal system). Uznadze (1966, p. 112) terms this the 'impulsive plane' of behavior. At the second level man becomes increasingly independent of the immediate nature of the stimulus (functioning within the second signal system). As Herzog notes .

This level of intellectual behavior ... is associated with the



phenomenon of objectification. The first place is characteristic of all animals; the second plane is peculiar to man whereby behavior now becomes regulated by man's cognitive structure. (1967, p. 15).

It is precisely because of man's ability to objectify that a set which is directly conditioned to a given situation can be changed (Natadze, 1962, p. 224). Man is thereby capable of relating to a situation in retrospect, or of purely cognitive problem solving.

Objectification occurs when the individual is faced with conditions which do not satisfy a need or an obstacle appears blocking need satisfaction. As a consequence the object causing the interference becomes an object of focus and the relationship of the subject towards the object becomes a cognitive one. The subject becomes conscious of, and objectifies, the situation which has been created, clarifies the interference which is present, and determines his course of action. As a result a new set arises.

Sets may be formed in various modalities; for example, set may be established in the haptic modality by the following experimental procedure. Two unequal spheres are presented to a blindfolded subject; he is allowed to grasp the spheres for a moment, then they are removed. The subject is asked to relate the comparative dimensionality of the spheres following each presentation. This procedure is repeated for a predetermined number of setting trials, during which the set (response tendency) becomes differentiated and fixed. The subject is then presented with two equal spheres, a presentation which is known as the critical test. In most cases, Uznadze found that subjects continued to perceive the spheres as unequal for a varying number of critical tests, a condition which he labelled set illusion. The ease with which a person establishes



a set, excitability or fixability, is measured by the number of trials required before the set is established.

Once the set has been fixed (an illusion established) the process of extinction is carried out. The critical tests are presented until the subject again acquires adequate perception. The ease with which a person extinguishes a set is measured by the number of trials required before adequate perception is attained.

Uznadze (1966, pp. 45-46) differentiated three phases in the process of extinction.

- (a) contrast illusion: The subject perceives that the two objects have been transposed.
- (b) assimilative illusion: The subject perceives a regression to the fixed set.
- (c) adequate (veridical) perception: The subject perceives the situation accurately.

Sets may be differentiated into two types by the behavior of the subject during extinction trials:

- (a) static set: The subject is unable to achieve adequate perception despite numerous exposures to the critical tests.
- (b) dynamic set: The subject achieves adequate perception in the critical tests.

In addition to being either static or dynamic a set may be classified as plastic or coarse. A plastic set is one in which the subject passes through all the phases of set extinction; a coarse set is one in which the subject does not manifest all intermediate phases.



Uznadze (1966, pp. 46-49) differentiates five types of sets by the properties exhibited in set extinction. An individual exhibiting a static-plastic set manifests sequential phases of set illusion, yet does not attain adequate perception. A static-coarse set is also characterized by the maintainance of set illusion; however, the sequence of extinction phases is incomplete. Similarly, a dynamic-plastic pattern involves all phases in the expected sequence, including adequate perception, while a subject exhibiting a dynamic-coarse set attains adequate perception with the omission of some part of the illusion sequence. Finally, Uznadze notes (1966, p. 49) that some subjects maintain accurate perception throughout and never exhibit a fixed set. They are presumed to be extremely susceptible to external control, and are termed extraverts.

In addition to patterns of set extinction, individual differences are observable in the generality of a fixed set. Subjects may vary in degree of generalization of a set under similar stimulus conditions. Subjects may also vary in the extent to which a set developed in one modality may transfer, or irradiate, into other modalities (Uznadze, 1966).

The concept of irradiation is a central one in Soviet set theory, supporting Uznadze's interpretation of set as a primary component of the total functioning of the organism. Although sets are manifested in behavior, their locus is presumably psychological. Set is conceived of as a central controlling influence, affecting a variety of activities in which the individual engages. As Prangishvili (1962, P. 186) explains, "set ... can be detected not only in the sphere of



perception, but 'everywhere where there is a conflict between the actual set of the subject and the stimulations acting upon this subject'."

Set, from a Soviet point of view, is conceptualized as being the primary aspect of the personality; indeed, it is the basic mechanism from which the personality develops. The concept of generalization establishes the centralistic nature of set, while the concept of objectification is akin to a cognitive mechanism whereby man is capable of modifying and changing his sets. Individual sets may be identified from the properties of set elaborated upon earlier (Stewin, 1969).

In accordance with Soviet philosophy, Uznadze presents a model of behavior in which the individual is an active dynamic person interacting with his environment. The individual is motivated by needs to seek a condition in his environment which will satisfy his needs. The particular pattern of behavior which the individual engages in is determined by his set.

Set, in this context, is a much more significant component of behavior than set as used by Schroder, Driver, and Streufert (1967, p. 31). Rather than controlling perception alone, set is here attributed the power of controlling large segments of the organism's behavior and, as such, determining to some extent the total personality of the individual.



## PART 3

## THEORETICAL INTEGRATION

Schroder et al. (1967) state that complexity is dependent upon three factors (information load, information diversity, and rate of change of information), all of which would be controlled by set as Uznadze conceptualizes it. These postulates lead one to assume that some observable relationship might exist between various set characteristics and conceptual systems functioning, dependent on the level of information processing characteristic of the individual.

As suggested earlier, patterns of set extinction are related to information processing in that attaining veridical perception is largely a function of acceptance and integration of relevant sensory stimuli. Set extinction also appears to be closely related to flexibility. Côté (1968) included set tasks in a battery of flexibility measures and found a high loading (.725) of set extinction on a flexibility factor. Flexibility is characteristic of a higher integrative index (Schroder et al., 1967); therefore one would anticipate that individuals of higher integrative index would tend to exhibit dynamic sets and individuals of lower integrative index would tend to exhibit static sets.

At this point it may be recalled that two measures are commonly utilized in set tests, trials to fixation (excitability) and trials to extinction. Although there is a tendency in the literature to consider these measures in some necessary relationship, there is no theoretical justification for such an assumption (Prangishvili, 1962, p. 229; Uznadze, 1966, pp. 77-78). Both trials to fixation and trials to extinction are related to pattern of set exhibited by the individual. Therefore indi-



viduals of higher integrative index, being more flexible (Schroder et al., 1967), should require fewer trials to extinguish a fixed set than should individuals of lower integrative index. Harvey (1966) and Harvey and Ware (1967) also suggest that lower system functioning is associated with lesser ability to change set.

Uznadze (1966, p. 49) suggests that individuals lacking in internal control, whom he terms extraverts, fail to fixate sets over large numbers of excitation trials. One might therefore expect individuals of lower integrative index, being dependent on external control (Harvey, Hunt, & Schroder, 1961, p. 121), to require more trials to fixate a set than would individuals of higher integrative index.

Sieber and Lanzetta (1966) have suggested that variations in latency are overt indications of conceptual complexity, that is, of the number of alternative responses generated and evaluated by the individual in a given situation. Latency in conjunction with errors has been utilized to define a dimension of problem-solving behavior termed impulsivity-reflectivity (Kagan et al., 1964). As Schroder et al. (1967) tend to view complexity as an information processing variable, primarily dependent on information differentiation and integration, some relationship between conceptual systems functioning and the dimension of impulsivity-reflectivity is suggested.

Ware and Harvey (1967) found individuals of lower conceptual systems more likely to form generalized opinions without complete information, which again implies that less complex individuals tend to make decisions quickly. These statements suggest that higher conceptual system functioning would tend to be related to reflectivity, defined by longer latency and fewer



errors in a problem situation, while lower conceptual system functioning would be related to impulsivity, defined by shorter latency and more errors.

Agreement response set relating to social acquiescence has been proposed by Couch and Keniston (1960) as a personality variable dependent on information processing style. Two personality types, yeasayers and naysayers, are distinguished by their acceptance or rejection of a number of social statements.

Lower systems functioning has been found to be related to a greater tendency toward categorical thinking (Adams, Harvey & Heslin , 1966; Ware & Harvey, 1967; White & Harvey, 1965) and a greater tendency to hold opinions with certainty (Harvey, 1967). Both of these characteristics appear to be exhibited by yeasayers and naysayers, one expressing categorical agreement, the other expressing categorical disagreement. This predisposition suggests that both personality types described by Couch and Keniston should exhibit lower conceptual system functioning.

The constructs under consideration are all assumed to be dependent on information processing traits of the individual. However, conceptual systems functioning is measured entirely within the domain of interpersonal perception; in fact, most authors of complexity measures subscribe the domain specificity of their instruments.

Most of the research regarding domain specificity suggests that, even among the measures developed, no unitary complexity factor can be identified (Scott, 1962, 1963; Vannoy, 1965). Gardiner (1968), however, using a unique battery of complexity measures and correlates, identified



three factors: an integrative complexity factor, a religious rejection factor, and a cognitive differentiation factor.

Lack of agreement between Gardiner's contention and that of other researchers suggests it would be useful to re-examine these findings on a similar sample utilizing those measures which appear most relevant to Gardiner's factors. On this basis, similar findings would be anticipated.

As mentioned previously, lower system functioning is associated with high dependence on external controls (Harvey, 1964, 1966; Harvey & Beverly, 1961; Harvey, Hunt, & Schroder, 1961). Dependency on religious authority is the basic characteristic of lower system functioning utilized by Harvey in conceptual classification on his Conceptual Systems Test.

Allport and Ross (1967) have suggested that overt religious dependency may be associated with both intrinsic and extrinsic religious orientations. Intrinsic religious dependency is associated with the belief system of the individual while extrinsic religious dependency is more representative of social acquiescence in the form of religious conformity. These religious orientations are consistent with characteristics of conceptual systems functioning described by Harvey, Hunt, and Schroder (1961). System I individuals, being highly reliant on authority and religion would be expected to be intrinsically religious; System III individuals, being oriented toward intra-group control, would be expected to be extrinsically religious. This hypothesis is supported by Gardiner's (1968) suggestion that religious rejection is a characteristic of System II and System IV functioning derived from emotional and intellectual interpretations of religion, respectively.



Allport and Ross (1967) also identified a variable termed indiscriminately pro-religious thinking, or the tendency to express agreement with religious stimuli regardless of content. As lower conceptual system functioning has been associated with categorical thinking (Adams et al., 1966; Ware & Harvey, 1967; White & Harvey, 1965), it is suggested that System I individuals will exhibit a tendency toward indiscriminately pro-religious thought.

Harvey's finding (1966, pp. 48-49), that church attendance is related to System I, III, IV, and II functioning, respectively, will be examined and interpreted relative to religious orientations as defined by Allport and Ross (1967). It is hypothesized that both intrinsic and extrinsic religious orientations will be associated with church attendance; however, intrinsicness, associated with religious dependency, will be reflected in higher church attendance than will extrinsicness, associated with religious utility. In terms of conceptual systems functioning, Systems I and III, respectively, will be expected to exhibit higher church attendance (Harvey, 1966).



## CHAPTER III

### HYPOTHESES

The purpose of the present study is twofold: a consideration of the global nature of complexity as defined by a battery of measures; and a consideration of some specific posited correlates of complexity. The former purpose will be accomplished through a factor analysis of selected measures of conceptual systems functioning and correlates as defined by Gardiner's (1968) investigation.

The latter purpose will be independently investigated. A second battery of conceptual systems tests and suggested correlates of system functioning will be factor analyzed in an attempt to examine the associations involved. Secondly, an attempt will be made to provide statistical support for a series of proposed relationships within the battery.

The following hypotheses will be considered:

H<sub>1</sub>: Factor analysis of a battery of conceptual systems measures and correlates will yield a number of significant relationships among these measures, paralleling those factors identified by Gardiner (1968) as integrative complexity, religious rejection, and informational dimensionality.

H<sub>2</sub>: Factor analysis of a battery of conceptual systems measures and correlates (set, agreement response set, impulsivity-reflectivity, religious orientation) will yield a single factor which accounts for a large portion of the variance of scores, and will be identified by high loadings of complexity measures.



H<sub>3</sub>: A number of significant relationships exist between conceptual systems functioning and set, agreement response set, impulsivity-reflectivity, and religious orientation.

- A. A significant difference will be found between conceptual systems in trials to set excitation and trials to set extinction.
- B. A significant difference will be found between Systems I and II in agreement response set.
- C. A significant difference in church attendance will be found between Systems I and III and Systems II and IV.
- D. A significant difference in intrinsic religious orientation, as measured by the ROS, will be found between conceptual systems.
- E. A significant difference in extrinsic religious orientation, as measured by the ROS, will be found between conceptual systems.
- F. The greatest proportions of subjects classified as possessing dynamic sets will be found in Systems III and IV.
- G. The greatest proportions of subjects classified as reflective will be found in Systems III and IV.
- H. The greatest proportions of subjects classified as impulsive will be found in Systems I and II.
- I. The greatest proportion of subjects classified as intrinsically religious will be found in System I.



- J. The greatest proportion of subjects classified as extrinsically religious will be found in System III.
- K. The greatest proportion of subjects classified as indiscriminately pro-religious will be found in System I.



## CHAPTER IV

### EXPERIMENTAL DESIGN

A number of measures have been designed to identify the conceptual system within which an individual appears to function (Harvey, 1964; Schroder & Streufert, 1962; Scott, 1962; Tuckman, 1966). Although these measures have been independently validated, few studies have attempted to isolate communality among these instruments (Gardiner, 1968; Gardner & Schoen, 1962; Vannoy, 1965). Gardiner's (1968) investigation uniquely revealed the presence in his battery of two factors which were interpreted as dimensions of complexity. As other factorial studies tend to contest the finding of complexity factors, one purpose of the present investigation was to further examine Gardiner's battery with an equivalent sample. With this intent, a modified battery, chosen for substantial contributions to Gardiner's factors, has been administered.

Secondly, the present study was designed to investigate a series of hypotheses regarding conceptual systems functioning and various other dimensions of personality. As several chosen instruments necessitated individual administration, a second sample was used for this purpose. For practical reasons, a minimum number of complexity measures was administered, selected primarily on the basis of objectivity of subject classification.

As neither samples nor batteries related to these considerations were identical, the design of the study will be discussed in two sections.



## PART 1 THE EDMONTON STUDY

The Edmonton sample was composed of 100 grade eleven students ( $\bar{CA} = 17.1$ ;  $s = 1.02$ ) randomly selected from a larger sample tested at two Edmonton high schools (Jasper Place and Eastglen Composite High Schools). Tests were administered to 205 subjects, complete data was available for 148 subjects.

The following battery was administered during the latter half of April, 1968:

### A. Complexity Measures

- (1) Interpersonal Topical Inventory
- (2) Paragraph Completion Test
- (3) This I Believe Test
- (4) Groups of Nations Test

### B. Proposed Complexity Measures

- (1) Inference Test
- (2) Gestalt Transformation Test
- (3) Associations IV Test

### C. Correlates of Complexity Measures

- (1) Embedded Figures Test (Form V)
- (2) Religious Orientation Scale
- (3) Internal-External Scale

Each instrument and scoring procedure will be briefly described.

### A. Complexity Measures

- (1) The Interpersonal Topical Inventory. The Interpersonal Topical



Inventory (ITI), devised by Tuckman (1966), consists of 36 forced choice situations. (See Appendix A.) Each response is designated as representative of a particular conceptual systems level. Therefore, choice of each response alternate permits the assigning of a complexity level score for that item.

The ITI consists of six stems, each presenting six choice situations. The forthcoming 72 alternatives are equally representative of the four conceptual systems, making the individual's maximum possible score in any system 18. Each subject obtains four raw scores, designating the number of choices made pertaining to each system. Intrasytem choices are converted to decile points, derived by Tuckman (1966), and conceptual systems membership is assigned on the basis of maximal decile rank. Subjects obtaining equivalent decile ranks in multiple systems are termed unclassifiable. (See Appendix A.) Tuckman (1966, p. 378) reports a contingency coefficient of .54 between the ITI and Paragraph Completion Test (Schroder et al., 1967) on a sample of 92 subjects classified in this manner.

Gardiner (1968), p. 42), however, found a great number of subjects unclassifiable by this procedure, and devised a novel scoring protocol.

In compliance with the aims of this study, subjects were classified according to Gardiner's (1968, pp. 42-43) protocol. For each response, the subject is assigned a score representative of the conceptual systems difference between the alternatives presented. The choice of the more complex alternative yields a



positive difference score whereas choice of the less complex alternative yields a negative difference score. Negative and positive scores for the 36 are then summed to yield a total ITI score. Gardiner justifies this procedure

on the grounds that an integratively-complex person should show a consistent tendency to choose more-complex over less-complex responses. Similarly, a person of low complexity should consistently choose alternatives of relatively low complexity (1968, p. 43).

Using this procedure, Gardiner (1968, p. 61) reports inter-correlations of .47 between the ITI and Harvey's "This I Believe" Test (see page 40) and .61 between the ITI and Schroder's Paragraph Completion Test (see following section). Using original scoring techniques Seudfeld, Tomkins and Tucker (1969, p. 46) obtained a correlation of .19 between the ITI and PCT (N=178).

(2) The Paragraph Completion Test. The Paragraph Completion Test (PCT) consists of a series of sentence fragments eliciting projective responses from subjects. (See Appendix B.) A time limit of two minutes per stem is imposed during administration. Six items were utilized and scored by the criterion outlined in Schroder et al. (1967, pp. 189-198). Schroder et al. (1967), p. 190 note that stems producing the highest inter-rater reliability are those implying (a) the presence of alternatives, uncertainty, or absence of structure, (b) the imposition of external standards, and (c) interpersonal conflict. They also suggest that satisfactory inter-rater reliability can be attained within four days once raters become familiar with the theoretical framework. Schroder et al. (ibid.) report inter-rater reliabilities of .80 to .95; Reed (1966, p. 25) reports inter-rater reliabilities of .79 to .87; Mishra (1964), p. 55) reports .99.



Gardiner (1968, pp. 45-46) again produced a modified scoring protocol which, in essence, eliminates from consideration those responses of intermediate complexity. Scoring is bipolar, assigning values of 4 to indicate higher complexity and -1 to indicate a lower complexity response. Item scores are summed to obtain a total PCT score. Gardiner (1968, p. 63) obtained a slightly higher loading on his factor of integrative complexity using the original scoring protocol than was obtained using his revision. Therefore, the PCT was scored according to Schroder et al. (1967) in this study. An inter-rater reliability of .83 was obtained.

(3) The This I Believe Test. The This I Believe Test (TIB), developed by Harvey (1964, 1965), is a projective complexity measure similar in form to the PCT. (See Appendix C.) Stems are of the form "This I believe about ..." Response time is again limited to two minutes per stem. A four point conceptual systems classification was employed, as described by Harvey (1966). Harvey (1966, p. 47) notes that global assigning of the individual's mode of conceptual functioning produces greater validity and higher reliability than does item analysis. This scoring technique has produced inter-rater reliabilities of .90 and above for various samples (*ibid.*)

Gardiner's (1968, p. 44) revised scoring protocol parallels that employed for the PCT; all responses are bipolarized and summed to obtain a total TIB score. However, higher loadings were noted on his factor of integrative complexity using the original scoring procedure (Harvey, 1966). The original protocol (Harvey, 1966) was therefore adopted in the present study. Inter-rater reliability of .85 was obtained.



Gardiner (1968, p. 61) reports an intercorrelation of .69 between the TIB and the PCT as originally scored.

(4) The Groups of Nations Test. The Groups of Nations test (Scott, 1962) consists of a list of 20 nations which the subject is requested to group on as many bases as he can devise. Groups need be neither complementary nor exclusive. (See Appendix D.) Gardiner's (1968) scoring system presents a considerable divergence from that discussed by Scott (1962), however, the original procedure tends to produce a skewed distribution (Gardiner, 1968, p. 46). In terms of the revised protocol, the subject is assigned both a quantity and a quality score on the bases of the number of groupings and the complexity of concepts underlying these groupings. (Quality scores range from 1 to 3.) (See Appendix D.) Each subject's total score is the sum of his quantity and quality scores. The quality score, it should be noted, is limited in range by the decision to assign one quality score to all groups formed on a particular categorical basis, rather than to assign a quality score for each grouping separately. Using Gardiner's scoring procedure, an inter-rater reliability of .89 was obtained.

Gardiner (1968, p. 61) reports an intercorrelation of .32 with the PCT and .22 with the TIB using this scoring procedure.

#### B. Proposed Complexity Measures

The three proposed complexity measures selected from Gardiner's battery are sub-tests of the Kit of Reference Tests for Cognitive Factors (French, Ekstrom, & Price, 1963). The Inference Test is there described as a measure of syllogistic reasoning, the Gestalt Transformation Test as a measure of semantic redefinition, and the



Associations IV Test as a measure of associational fluency.

(1) The Inference Test. The Inference Test used by Gardiner (1968) is an adaptation of one by Berger, Guilford, and Christensen (1957). Subjects are requested to choose between five given conclusions on the basis of the information available in a preceding statement. (See Appendix E.) Correct choices are summed to yield the individual's score. The test is composed of two 10 item sections; allotted time is six minutes per section. The Inference Test was chosen by Gardiner as a possible measure of complexity as it demands both selection and organization of relevant information to attain the correct solution. As such, it was considered an indication of complexity.

(2) The Gestalt Transformation Test. The Gestalt Transformation Test (Guilford, Wilson, & Christensen, 1952) has been used as a measure of creativity (Garwood, 1964; Tuckman, 1966). The subject is required to indicate which of five listed objects would best enable him to successfully complete a specified activity. (See Appendix F.) The subject's score is the sum of his correct choices. The Gestalt Transformation Test consists of two 10 item sections; allotted time is five minutes per section.

Gardiner's rationale for the inclusion of this task as a measure of complexity, is as follows:

Conceptual complexity includes the ability to overcome functional fixedness and go beyond the information given. The cognitively complex person theoretically possesses the ability to spontaneously generate new schemata in an ambiguous situation (Schroder, et al., 1967, p. 25), while the conceptually simple person remains bound by the stimulus configuration (*ibid.*, p. 23) (Gardiner, 1968, p. 55).



(3) The Associations IV Test. The Associations IV Test (Guilford, et al., 1952) requires the subject to supply a linking word differently related to two given words. (See Appendix G.) The test is composed of two 15 item sections; allotted time is seven minutes per section. A score of 1 is assigned to each correct association; scores are summed to yield the total score. The Associations IV Test was proposed as a complexity measure by Gardiner (1968, p. 54) "to the extent that a complex person should be less tied to a single, fixed association than would a simple person (Sieber & Lanzetta, 1966, p. 569)."

Gardiner (1968, p. 61) reports the following intercorrelations between these proposed measures and complexity measures:

	ITI (Revised)	Schroder PCT	Harvey TIB	Groups of Nations
Inference Test	.23	.23	.23	.28
Gestalt Trans- formation	.03	.31	.26	.31
Associations IV	.19	.27	.25	.18

Reliability estimates obtained by correlating subject's scores on each section and correcting by the Spearman Brown formula for double length tests are reported by Reed (1966, p. 26): Inference Test, .76; Gestalt Transformation Test, .66; Associations IV Test, .75.

The three measures,, which Gardiner found to be related to a complexity dimension, appear heavily linguistic. French et al. (1963) describe the primary abilities involved in performance on these tests as, respectively, the evaluation of semantic relations,



semantic redefinition (flexibility of verbal set, and associational fluency (the ability to produce words from a restricted area of meaning).

#### C. Correlates of Complexity Measures

The following measures were selected from Gardiner's proposed correlates of complexity primarily on the basis of substantial loadings on his complexity factors.

(1) Embedded Figures Test (Form V). The embedded Figures Test (Form V) (EFT) is a group measure of field dependence, emphasizing memory of forms (Jackson, Messick, & Meyers, 1964, p. 188). Form V of the EFT consists of 16 pairs of simple and complex figures presented in booklet form. (See Appendix H.) Complex figures, within which the simple figure is to be identified, are presented on the reverse side of the page. The subject is required to identify, by tracing, as many of the embedded figures as possible within ten minutes. Number of correct identifications completed constitutes the individual's score.

Gardiner proposed that field independence is positively related to conceptual complexity in line with Harvey's (1966, p. 54) earlier finding to this effect.

(2) The Religious Orientation Scale. The Religious Orientation Scale (ROS), devised by Allport and Ross (1967) consists of 20 multiple choice items. Randomly placed are the 9 items of the intrinsic subscale and the 11 items of the extrinsic subscale. (See Appendix I.) Each item has four alternates, choice of which indicates the subject's degree of agreement or disagreement with the item. Choices



are assigned values of 1, 2, 4, and 5; unanswered items are assigned a score of 3. Intrinsic responses to items are low in value; extrinsic responses are high. Separate summed scores for the intrinsic and extrinsic subscales are obtained. Medians for both intrinsic and extrinsic scales are obtained and subjects are classified on this basis. Subjects scoring above both medians are termed extrinsic; subjects scoring below both medians are termed intrinsic. A difference (I - E) score is also obtained. Individuals who obtain a difference score of -12 or less (12 points less on the intrinsic than the extrinsic subscale) are designated as indiscriminately pro-religious (IPR). A score of this magnitude indicates that the individual records at least 50 per cent more intrinsic choices than would be predicted from his extrinsic choices (Allport & Ross, 1967, p. 438). An indication of frequency of church attendance is also obtained from item 12 of the ROS.

Religious beliefs have frequently been considered as a major characteristic of conceptual systems functioning (Harvey, 1966, p. 48), as has been discussed previously (see page 16).

(3) The Internal-External Scale. The Internal-External Scale (I-E) consists of 25 forced choice items, requiring the subject to choose between externally-worded and internally-worded parallel statements. (See Appendix J.) This version of the I-E Scale was given by Rotter (1966, pp. 11-12) and incorporates three filler items to obscure the test intent. The total number of externally-worded alternates chosen constitutes the individual's score.

Gardiner (1968, p. 37) hypothesized the existence of a negative



relationship between externality and cognitive complexity. A number of empirical findings relevant to this dimension are reported by Phares, Ritchie and Davis (1968).

Gardiner (1968, p. 61) reports these intercorrelations between correlates of complexity measures and complexity measures:

	ITI (Revised)	Schroder PCT	Harvey TIB	Groups of Nations
EFT (Form V)	.14	.20	.28	.22
Religious Orientation Scale	-.11	-.20	-.24	-.09
ROS Intrinsic Subscale	-.24	-.29	-.37	-.09
ROS Church Attendance	-.13	-.16	-.10	.05
Internal-External Scale	-.01	-.13	-.03	-.06

Principal axes factor analysis of Gardiner's completed battery revealed seven factors which were then subjected to Varimax rotation. Three factors were considered psychologically significant and interpreted. High loadings of the ITI, and PCT, and the TIB led Gardiner to interpret his first factor as representative of integrative complexity. His second factor, described by ROS and I-E Scale loadings, was interpreted as religious rejection. Factor 3 was interpreted as descriptive of informational dimensionality on the basis of significant loadings by the PCT, the TIB, Groups of Nations, several proposed complexity measures, and the EFT.



## PART 2

## THE WETASKIWIN STUDY

As previously mentioned, the present investigation served dual purposes, necessitating the administration of two batteries to separate subject groups. The second aspect of the study concerned the investigation of a number of behavioral variables as they related to conceptual systems functioning.

The second sample was composed of 107 grade eleven students ( $\bar{CA} = 17.2$ ;  $s = 0.99$ ) randomly selected from Wetaskiwin Composite High School.

The following battery of instruments was administered by the author in December, 1968:

A. Complexity Measures

- (1) Interpersonal Topical Inventory
- (2) Conceptual Systems Test

B. Correlates of Complexity Measures

- (1) Agreement Response Scale
- (2) Religious Orientation Scale
- (3) Set Test (Haptic Modality)
- 
- (4) Matching Familiar Figures Test (Adult Version)

The latter two measures of the battery necessitated individual administrations requiring approximately 30 minutes per subject. Administration of the total battery was completed within three weeks.

Directions for all tests were read by the author and timing, when required, was also performed by stop watch by the examiner. All subjects completed all sections within the specified time limits. Questions



regarding instruments were answered by the examiner.

Each instrument and scoring procedure will be briefly described.

A. Complexity Measures

(1) The Interpersonal Topical Inventory. The Interpersonal Topical Inventory (ITI) has been previously described (see page 37). However, Tuckman's scoring procedure was utilized in this instance as the difficulty in classification noted by Gardiner (1968, p. 45) was not apparent in this sample. Additionally, individual classifications of system functioning were desirable. Tuckman's (1966) college freshman decile ranks were utilized. (See Appendix A.)

(2) The Conceptual Systems Test. The Conceptual Systems Test (CST) is an objective measure of conceptual level derived from actual subject responses to the TIB (see page 40). The subject is required to respond to 49 statements on a Likert scale, indicating his degree of acceptance or rejection of that statement. Low values indicate disagreement except on items 42 and 44, which are scored in the reverse direction. (See Appendix K.)

Factor analysis of the CST has yielded a number of factors which are "theoretically consistent with the major characteristics of the four principal belief systems posited by Harvey and others (1961) (Harvey et al., 1968, p. 156)." These six factors have been tentatively labeled as Divine Fate Control (DFC), Need for Structure Order (NS-O), Need to Help People (NHP), Need for People (NFP), Interpersonal Aggression (IA), and Anomie (AN). Coates (1968, p. 56) reports the following reliability figures over one



year: Divine Fate Control, .89; Need for Structure-Order, .72; Need for People, .83. Bower (1969) reports a Harvey (one-week) test-retest reliability estimate of .89 on the CST.

Items loading on each CST factor have been identified, forming subscales pertaining to each factor. The CST is scored to yield six mean subscale scores; subjects are then classified into systems in accordance with cutting points on the CST profile (Harvey, 1967). (See Appendix K.) CST scoring was by the Fortran program constructed by A. Bower.\*

The ITI and CST were chosen as measures of complexity in this study on the basis of their objectivity and ease of scoring and to permit classification into "stage types". The ITI is considered as the primary complexity measure in this instance because of its presence in both the Edmonton and Wetaskiwin batteries.

#### B. Correlates of Complexity Measures

The rationale underlying the inclusion of each of the following measures as a possible correlate of complexity has been previously discussed. (See Chapter II.)

(1) The Agreement Response Scale. The Agreement Response Scale (ARS), devised by Couch and Keniston (1960), measures the tendency of the subject to agree with statements irrespective of their particular content. This tendency has been denoted as agreement response set. The ARS consists of 19 items, 12 of which exhibit high positive loadings on the ARS dimension. The remaining 7

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\* Unpublished program devised by the Department of Educational Psychology, University of Alberta, January, 1969.



exhibit high negative loadings. Subjects are required to respond to the 19 statements on a Likert scale, indicating their degree of agreement or disagreement with each item. High values indicate agreement on the first 12 items; however, the latter 7 items are scored in the reverse direction. (See Appendix L.) Response values are summed to yield a total ARS score.

(2) The Religious Orientation Scale. The ROS and scoring technique have been previously discussed. (See page 44. See also Appendix I.)

(3) The Set Test (Haptic Modality). The set test developed by Uanadze (1966) is individually administered. Materials consist of three wooden spheres of equal weight (300 grams) but unequal diameters. Two spheres are equivalent (70 mm.); one is larger (100 mm.). Administration and scoring of the haptic set test is fully described in Appendix M. Data obtained consists of trials to set fixation, trials to set extinction, and pattern of set extinction (Uznadze, 1966).

Hritzuk (1968, p. 101) reports Spearman test-retest correlations of .98 for both fixation and extinction trials in the haptic modality for 25 subjects over one week.

(4) The Matching Familiar Figures Test (Adult Version). The Matching Familiar Figures Test (Adult Version) or MFF was devised by Yando and Kagan (1968) to evaluate the dimension impulsivity-reflectivity. The MFF consists of 12 visual matching situations. The subject is simultaneously presented with a standard and eight



alternates, and is requested to choose the alternate which replicates the standard. (See Appendix N.)

A response latency score between presentation of the situation and response to one alternate is obtained to the nearest half second. Latency to initial choices only are recorded. If response errors occur, the subject is informed he is incorrect and requested to continue responding until the correct alternate is selected. Initial latency scores and total error scores per item are summed to yield total scores for the test. Medians in latency and errors for the group are obtained and subjects are classified on a dual basis. Subjects above the median in latency and below the median in errors are termed reflective; subjects below the median in latency and above the median in errors are termed impulsive. Remaining subjects are unclassifiable.

No reliability figures appear to be available for the MFF, Adult Version. However, Kagan (1965c) reports the following test-retest reliabilities for an analogous children's version, offering fewer (6) alternates:

	Boys	Girls
Response time	.48	.50
Error Scores	.25	.51

As noted previously, both samples and batteries used in the two sections of the study are distinct. However, some similarity will be observed. The two samples appear comparable in terms of chronological age and educational level; therefore, one might



expect that the results obtained on one such sample might prove relevant to the interpretation of results on the alternate sample.

Regarding instrumentation, both the ITI as a measure of complexity and the ROS as a correlate of complexity measure are common to both the Edmonton and Wetaskiwin batteries. The CST used in the Wetaskiwin study parallels subject responses to the TIB used in the Edmonton study. One heterologous feature of the batteries appears worthy of mention. The modified battery selected from Gardiner's measures appears heavily linguistic. Among the Edmonton battery, only the EFT appears to demand little specific verbal skill from the subjects. The Wetaskiwin battery differs in composition in its inclusion of fewer verbal measures and more apparently non-verbal measures as correlates of complexity. It may therefore be expected that factor analysis of the two batteries may reveal divergent factors, which may be partially related to the verbal nature of the complexity measures and correlates thus far examined.



## CHAPTER V

### STATISTICAL DESIGN AND RESULTS

#### PART 1

#### STATISTICAL DESIGN

The present study was concerned with two general problem areas, the first being to further examine the finding of Gardiner (1968) that communality exists among complexity measures, the second being to investigate a number of relationships between conceptual systems functioning and other personality constructs of current importance.

Each set of data was initially subjected to a principal axes factor analysis (Harman, 1967) followed by a varimax rotation. A factor match (Kaiser, 1960b) was then performed between variables common to the Edmonton data and Gardiner's data. Using Wetaskiwin data, independent analyses of variance were performed between levels of conceptual systems functioning and ARS scores, set fixation trials, set extinction trials, ROS intrinsic subscale values, ROS extrinsic subscale values, and ROS church attendance. The relationships between conceptual systems functioning and dynamism of set, impulsivity, reflectivity, intrinsic religious orientation, extrinsic religious orientation, and IPR thinking were analyzed by chi square tests of goodness to fit (Siegel, 1956, pp. 42-47).

#### Factor Analysis

Factor analysis is essentially a technique for examining the extent to which the performance of a group of subjects on a variety of measures is attributable to the presence, absence, or interrelationship of a number of factors common to those tests. The purpose of factor



analysis is to examine the relationships within a test battery more parsimoniously.

A basic assumption underlying factor analysis (Fruchter, 1954, p. 44) is that a number of intercorrelated variables, however disparate their appearance, reflect the presence of some common attribute. This common attribute or factor need not exist independently of the battery in which it is found. A factor is essentially a hypothetical construct devised to explain the variance between a number of tests. The extent to which each test in the battery measures this factor is expressed quantitatively as its factor loading.

#### Varimax Rotation

Varimax rotation of the factors was performed by the Kaiser method (Harman, 1967) in an attempt to achieve simple structure. Simple structure (Cronbach, 1960) is manifest when a large number of factor loadings are near zero, so that performance may be explained in terms of a minimum number of factors. This circumstance admits greater ease of interpretation (Harman, 1967). Only principal axes factors with eigenvalues greater than one were regarded as significant, as they contributed more variance than did a single test (Kaiser, 1960a). These factors were rotated according to the varimax criterion.

#### Analysis of Variance

Analyses of variance were performed on several relationships between variables to test for significant differences between groups. A parametric measure was selected because "that test will be more powerful than any other in rejecting  $H_0$  when it is false (Siegel, 1956, p. 19)." The usefulness of the analysis of variance model is



noted by Winer (1962, p. 47).

Chi Square Test of Goodness of Fit

Some measures utilized in the study yielded nominal data. A series of chi square tests (Siegel, 1956, pp. 42-47) were computed to test for the significance of relationships between pairs of these variables.



## PART 2

## STATISTICAL ANALYSES AND RESULTS

As the reported investigation concerned two distinct sets of hypotheses and distinction between samples has been made, results of the two testing sessions will be dealt with separately. Some attempt at integration and generalized conclusions will follow.

The Edmonton Study

The Edmonton study concerned the description of the nature of complexity. Unequivocal findings regarding this construct have been discerned in the literature leading to the hypothesis that factor analysis of a battery of conceptual systems measures and correlates would yield a number of significant relationships among those measures, paralleling those factors identified by Gardiner (1968). As a result, a modification of Gardiner's (1968) study has been attempted, selecting from his battery those instruments which appeared to contribute most heavily to the description of complexity. Gardiner employed a principal axes factor analysis (Harman, 1967) which was then subjected to varimax rotation. In the present study, identical statistical analyses were performed. These procedures were followed by a factor match (Kaiser, 1960b) between certain of Gardiner's variables and those of the present analysis.

Table I contains the intercorrelations between the 13 variables of the Edmonton study. Five eigenvalues greater than one were obtained. The unrotated factor matrix, with the communalities of the variables, is presented in Table II. Sums of squares of the loadings for each factor are given, as well as the percentage of common variance and the percentage of total variance accounted for by each factor.



TABLE I

INTERCORRELATIONS BETWEEN COMPLEXITY MEASURES AND CORRELATES:  
EDMONTON SAMPLE

	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13
1	GESTALT TRANSFORMA TION		1.000											
2	ASSOCIATIONS IV	227*	1.000											
3	INFERENCE TEST	336	401	1.000										
4	EMBEDDED FIGURES TEST V	174	191	250	1.000									
5	INTERPERSONAL TOPICAL INVENTORY	012	045	135	-182	1.000								
6	PARAGRAPH COMPLETION TEST	038	187	131	-086	167	1.000							
7	THIS I BELIEVE	142	277	308	114	112	408	1.000						
8	GROUPS OF NATIONS	141	194	244	143	-055	128	206	1.000					
9	INTERNAL-EXTERNAL SCALE	-256	154	062	-191	-022	075	-023	-089	1.000				
10	ROS INTRINSIC SUBSCALE	-022	045	147	-156	-107	-026	015	-081	290	1.000			
11	ROS EXTRINSIC SUBSCALE	-085	026	-021	-008	-037	-080	-110	054	094	-207	1.000		
12	ROS CHURCH ATTENDANCE	-034	052	132	-208	-010	042	066	-112	070	461	-033	1.000	
13	ROS INDISCRIMINATELY PRO-RELIGIOUS	--024	008	171	037	148	-173	-023	-120	-116	395	474	-057	1.000

\* All decimal points omitted except in diagonal.



TABLE II

## EDMONTON SAMPLE UNROTATED PRINCIPAL AXES FACTOR LOADINGS

	VARIABLES	FACTOR LOADINGS					COMMUNALITY
		I	II	III	IV	V	
1	GESTALT TRANSFORMATION	515*	107	-289	-074	482	598
2	ASSOCIATIONS IV	564	304	150	402	024	596
3	INFERENCE TEST	741	056	096	128	-188	613
4	EMBEDDED FIGURES TEST V	474	-157	-472	257	-022	539
5	INTERPERSONAL TOPICAL INVENTORY	154	001	552	-515	136	612
6	PARAGRAPH COMPLETION TEST	315	449	398	-272	-311	630
7	THIS I BELIEVE	543	413	258	-096	-013	532
8	GROUPS OF NATIONS	473	129	-140	157	-291	369
9	INTERNAL-EXTERNAL SCALE	-274	311	407	530	-317	719
10	ROS INTRINSIC SUBSCALE	-390	675	-076	281	285	773
11	ROS EXTRINSIC SUBSCALE	007	-536	415	461	037	673
12	ROS CHURCH ATTENDANCE	-338	426	190	108	599	702
13	ROS INDISCRIMINATELY PRO-RELIGIOUS	179	-697	436	137	322	805
	SUMS OF SQUARES	2.363	2.002	1.456	1.225	1.115	8.162
	% OF COMMON VARIANCE	28.95	24.53	17.84	15.02	13.66	100.00
	% OF TOTAL VARIANCE	18.18	15.40	11.20	9.42	8.53	62.78

\* All decimal points have been omitted.



The five factors extracted were then rotated to simple structure by the varimax method (Harman, 1967). These factors are presented in Table III.

Interpretation of the Factors. Loadings exceeding  $\pm .300$  on the rotated factors have been interpreted.

#### Factor 1

The following tests defined factor one, which accounted for 26.12 per cent of the common variance and 16.39 per cent of the total variance.

Associations IV	.758
Inference Test	.697
TIB	.598
Groups of Nations	.489
Gestalt Transformation	.401
PCT	.383
EFT	.375

High positive loadings on this factor by three complexity measures and four correlates of complexity suggest that it may be interpreted as a complexity factor. Desirable subject responses on these instruments appear to incorporate both aspects of complex cognitive functioning, dimensionality and integrative ability. This factor would appear to resemble that identified by Gardiner (1968, p. 67) as a factor of informational dimensionality or cognitive differentiation.

Associations IV, which contributes the highest loading to this factor, is described by French et al. (1963, p. 12) as a measure of associational fluency or the ability to produce words within a res-



TABLE III

## EDMONTON SAMPLE ROTATED FACTOR LOADINGS (VARIMAX)

	VARIABLES	FACTOR LOADINGS					COMMUNALITY
		I	II	III	IV	V	
1	GESTALT TRANSFORMATION	.401*	-.037	143	-641	-075	598
2	ASSOCIATIONS IV	.758	.065	.091	.088	-.041	596
3	INFERENCE TEST	.697	.185	-.066	-.287	.081	613
4	EMBEDDED FIGURES TEST V	.375	.004	-.283	-.295	-.480	539
5	INTERPERSONAL TOPICAL INVENTORY	-.001	.148	-.003	-.134	.756	612
6	PARAGRAPH COMPLETION TEST	.383	-.294	-.105	.220	.581	630
7	THIS I BELIEVE	.598	-.154	.026	-.039	.385	532
8	GROUPS OF NATIONS	.489	-.160	-.295	.037	-.127	369
9	INTERNAL-EXTERNAL SCALE	.147	.044	.236	.799	-.042	719
10	ROS INTRINSIC SUBSCALE	.029	-.350	.761	.212	-.164	773
11	ROS EXTRINSIC SUBSCALE	.026	.765	-.082	.263	-.107	673
12	ROS CHURCH ATTENDANCE	-.059	.007	.829	-.017	.104	702
13	ROS INDISCRIMINATELY PRO-RELIGIOUS	-.009	.871	-.097	-.152	.121	805
		2.131	1.665	1.550	1.432	1.382	8.162
		26.12	20.40	18.99	17.55	16.94	100.00
		16.39	12.81	11.92	11.02	10.64	62.78

\* All decimal points have been omitted.



stricted area of meaning, as well as the ability to be aware of similarities between these words. Two conceptual abilities appear relevant to success on this task, differentiation (number of associations) and discrimination (associations within the dimension). Performance on the Inference, Gestalt Transformation, and EFT would also appear to rely heavily on discrimination along a given dimension. Groups of Nations, as scored in this study, appears to be primarily a measure of differentiation, a necessary precondition of discrimination. Gardiner (1968, p. 68) suggests that the TIB and PCT demand dimensionality to some extent.

The relevance of this factor to the nature of integrative complexity is noted by Schroder, Driver, and Streufert (1967, pp. 165-184). They state that the abstractness of a structure is dependent on three variables: number of dimensions (differentiation), number of ways of discriminating along a dimension (discrimination), and complexity of integrative schemata (integration).

The described factor appears similar to Gardiner's cognitive differentiation factor except for a more prominent emphasis on discrimination, which succeeds differentiation. This factor might best be interpreted as one of intradimensional discrimination.

### Factor 2

Factor two accounted for 20.40 per cent of the common variance and 12.81 per cent of the total variance. The following loadings were obtained:

IPR	.981
Extrinsic ROS	.765
Intrinsic ROS	-.350



High positive loadings on IPR and extrinsic ROS and moderate negative loadings on intrinsic ROS describe this factor. The PCT contributed a loading of -.294, suggesting a tendency toward lower integrative complexity. This factor was interpreted as one of indiscriminately pro-religious thinking. IPR subjects are defined by Allport and Ross (1967, p. 438) as giving approximately 50 per cent more intrinsic responses than would be expected from their extrinsic choices. ROS subscale loadings indicate this factor receives substantially higher extrinsic ROS than intrinsic ROS loadings, which suggests a primarily extrinsic orientation or religious acquiescence. In this instance, a significant intrinsic ROS loading was interpreted as indicative of acquiescence rather than true intrinsic religious belief. This suggestion is supported by the finding that high intrinsic scores were unaccompanied by significant levels of church attendance.

This factor would appear to be the religious correlate of low integrative complexity (Schroder et al., 1967) in that lower levels of integrative complexity are characterized by little differentiation, little discrimination, and little integration. The strong tendency toward IPR acquiescence exhibited on factor two suggests it may be interpreted as a factor of low religious complexity or of indiscriminately pro-religious response.

### Factor 3

Factor three was defined by the following loadings, and accounted for 18.99 per cent of the common variance and 11.92 per cent of the total variance;

ROS Church Attendance	.829
Intrinsic ROS	.761



This factor was described by rejection of intrinsic ROS (true religious beliefs) and low church attendance. Factor three is also identified with low dimensionality (Groups of Nations, -.295), field dependence (EFT, -.283), and externality (I-E scale, .236). This factor closely resembles that which Gardiner (1968, p. 65) labelled "religious rejection." However, rejection of religious beliefs is not coupled with rejection of extrinsic or pragmatically oriented religious items, which complements the observed tendency toward field dependence and externality.

Harvey (1966, p. 49) notes that both Systems II and IV tend to reject religious beliefs and participation, on differing bases. The factor of religious rejection under consideration appears consistently related to lower conceptual systems functioning and its correlates, rather than to higher functioning. The undifferentiated cognitive style associated with field dependence and externality of orientation support this suggestion.

#### Factor 4

Factor four, which accounted for 17.55 per cent of the common variance and 11.02 per cent of the total variance, was defined by the following loadings:

I-E Scale	.799
Gestalt Transformation	-.641

Factor four is primarily described by high external dependence and low creativity in the form of low Gestalt Transformation scores as interpreted by Garwood (1964) and Tuckman (1966). However, French



et al. (1963, p. 35) suggest that the necessary ability for success on this task is flexibility of set as it pertains to the common function of a specified object. Low scores on Gestalt Transformation, in this context, suggest functional fixedness.

Factor four is also identified with field dependence (EFT, -.295), low deductive reasoning ability (Inference Test, -.287), and extrinsic religious orientation (Extrinsic ROS, .263; Intrinsic ROS, .212).

Factor four appears to be primarily a factor of external dependence. Within this battery, no consistent relationship between external dependence and conceptual systems functioning could be observed. Harvey (1966, p. 53) reports that, on a measure of need for affiliation devised by French, "System 3 individuals were the highest, followed by Systems 1, 4, and 2, in that order." Consequently, lack of a unitary complexity measure trend, in the present study, on a factor of external dependence gains support. System I functioning (Harvey, 1966, p. 44) is characterized by dependence on authorities, whereas System III functioning (ibid., p. 45) tends to be associated with pragmatic dependence on, or manipulation of, others. Differing modes of dependency observed in individuals of distinct conceptual systems levels might be expected to produce the factor described (Harvey, Hunt, & Schroder, 1961, p. 188).

#### Factor 5

Factor five, described below, accounted for 16.94 per cent of the common variance and 10.64 per cent of the total variance.



ITI	.756
PCT	.581
EFT	-.480
TIB	.385

Factor five is defined by moderate to high positive loadings on three complexity measures and a moderate negative loading on field independence. Comparatively higher loadings on the ITI and PCT than on the TIB suggest that this factor may be more representative of integrative complexity, than of differentiation. Moderate negative loadings on the EFT and a negative loading on Groups of Nations (-.127) tend to support the indication that low dimensionality is an attribute of this factor. This factor appears to resemble that identified by Gardiner (1968, p. 60) as one of integrative complexity.

Schroder et al. (1967, p. 115) have suggested that a low order relationship between the TIB and PCT is to be expected as the TIB is scored largely on a content basis while the PCT is scored on a structural basis. Schroder et al. (1967, p. 114) also suggest that, in a visual recognition situation, more abstract individuals tend to require more time to complete a task and to express more uncertainty regarding their solution than do more concrete individuals. They note that

Information search and information processing by abstract persons increase more with increasing uncertainty than do search and processing by concrete persons (*ibid.*, p. 44).

In an ambiguous situation, such as the EFT offers, the more complex individual produces many more integrations of the information given and more carefully examines each possible solution. The less



complex individual, conversely, tends to structure the stimulus field and, in so doing, reduce the ambiguity presented. Poorer levels of performance on the EFT associated with greater complexity may be reasonably considered as an indication, not of field dependence per se, but of a tendency to admit greater ambiguity in a decision making situation.

Factor analysis of the Edmonton battery identified five factors which appeared psychologically meaningful. These have been interpreted as factors of intradimensional discrimination, indiscriminately pro-religious response, religious rejection, external dependence, and integrative complexity.

The primary purpose of this analysis was to reconsider Gardiner's findings of an integrative complexity factor, a religious rejection factor, and an informational dimensionality factor in a comparable battery. It has been suggested, in the present study, that certain of the obtained factors resembled, or paralleled, those obtained by Gardiner. A factor match between Gardiner's data and the Edmonton data was completed to investigate this contention.

The theory and application of factor matching has been discussed by Ahmavaara (1954), Borko (1965), and Kaiser (1960b). The factor match utilized in the present study was conducted by the Kaiser (1960b) method as it retains orthogonality of the factors. The five Edmonton battery factors were matched with Gardiner's seven factors. Although Gardiner (1968, p. 60) stated that only three of his factors appeared psychologically meaningful to his study, it was felt that use of all seven factors would provide a broader base upon which the match could be made.



Eleven variables were found to be common to both studies. Table IV presents the factor loadings obtained by Gardiner on these variables; Table V presents the present study factor loadings on these variables. Table VI reports the cosines of angles of rotation between the matched factors. The factor match disclosed that the best matches occurred between the factors of integrative complexity identified in both studies, between factors of religious rejection in both studies, and between Gardiner's factor of informational dimensionality and the present study factor of intradimensional discrimination. It might also be noted that a good match was obtained between Gardiner's sixth factor, which was not interpreted, and the factor identified as external dependence in the present analysis. To obtain these matches, rotations of approximately 23, 21, 32, and 31 degrees, respectively, were required.

In accordance with the aims underlying this section of the study, it appears justifiable to assume that Gardiner's findings, for this battery and this sample, have received support. However, Gardiner's final interpretation of these findings appear somewhat at variance with that of the present author. Gardiner (1968, p. 86) states that he obtained tentative support for the hypothesis that factor analysis would reveal a factor representative of cognitive complexity. However, this effect was obtained through a varimax rotation of two factors, integrative complexity and informational dimensionality, the effect of which was to transfer the dominant loadings onto the former factor.

It would appear in the present analysis that two complexity dimensions have been identified, intradimensional discrimination and integrative complexity. Schroder et al. (1967), pp. 14-15) note that dimensionality exhibits no necessary relationships to information



TABLE IV

FACTOR MATCH DATA:  
 VARIMAX FACTOR LOADINGS TAKEN FROM GARDINER (1968)

	VARIABLES	FACTOR LOADINGS						
		I	II	III	IV	V	VI	VII
1	INTERPERSONAL TOPICAL INVENTORY	929*	-085	-010	060	-098	-036	072
2	PARAGRAPH COMPLETION TEST	758	-120	352	-060	071	305	008
3	THIS I BELIEVE	586	-190	554	151	118	122	-010
4	ASSOCIATIONS IV	244	193	166	146	-070	457	-133
5	GESTALT TRANSFORMATION	-008	108	460	-084	-159	651	116
6	INFERENCE TEST	107	-085	306	154	-572	-404	121
7	INTERNAL-EXTERNAL SCALE	014	375	227	-049	136	-500	096
8	GROUPS OF NATIONS	1.45	026	537	151	-108	143	-075
9	EMBEDDED FIGURES TEST V	039	-183	639	-122	-182	-117	-070
10	ROS INTRINSIC SUBSCALE	-186	913	-162	029	004	003	047
11	ROS CHURCH ATTENDANCE	-070	781	060	181	-051	-087	037

\* All decimal points have been omitted.



TABLE V

FACTOR MATCH DATA:  
VARIMAX FACTOR LOADINGS TAKEN FROM EDMONTON SAMPLE

	VARIABLES	FACTOR LOADINGS				
		I	II	III	IV	V
1	INTERPERSONAL TOPICAL INVENTORY	-001	148	-003	-134	756
2	PARAGRAPH COMPLETION TEST	383	-294	-105	220	581
3	THIS I BELIEVE	598	-154	026	-039	385
4	ASSOCIATIONS IV	758	065	091	088	-041
5	GESTALT TRANSFORMATION	401	-037	143	-641	-075
6	INFERENCE TEST	697	185	-066	-287	081
7	INTERNAL-EXTERNAL SCALE	147	044	236	799	-042
8	GROUPS OF NATIONS	489	-160	-295	037	-127
9	EMBEDDED FIGURES TEST V	375	004	-283	-295	-480
10	ROS INTRINSIC SUBSCALE	029	-350	761	212	-164
11	ROS CHURCH ATTENDANCE	-059	007	829	-017	104

\* All decimal points have been omitted.



TABLE VI  
COSINES\* OF ANGLES OF ROTATION

EDMONTON SAMPLE FACTORS	GARDINER'S (1968) FACTORS						
	I	II	III	IV	V	VI	VII
I	307 <sup>a</sup>	131	849**	180	-273	242	-040
II	-013	-193	-188	418	-769	-375	145
III	-054	931**	-231	140	-140	136	140
IV	-167	244	229	080	323	-860**	-102
V	918**	-061	-333	084	099	104	122

\* cosines above .800 considered significant

\*\* significant factor match

<sup>a</sup> all decimals omitted

EDMONTON SAMPLE FACTORS	GARDINER'S (1968) FACTORS
I Intradimensional discrimination	I Integrative complexity
II Indiscriminately pro-religious response	II Religious rejection
III Religious rejection	III Informational dimensionality
IV External dependence	IV Not defined
V Integrative complexity	V Not defined
	VI Not defined
	VII Not defined



processing; rather, higher integrative index is the primary attribute of increasing complexity. However, increased dimensionality and discrimination are assumed to accompany higher complexity levels in a secondary position. Structure, rather than content, remains the more important aspect of the Schroderian concept of cognitive functioning. It would therefore seem permissible to accept both factors, as identified, as dimensions of complexity which, although inseparable in the functioning of the individual, may be considered as theoretically and factorially distinct.

In contrast to the findings of Vannoy (1965), the present analysis and that of Gardiner (1968) tend to support the presence of complexity factors within the batteries utilized. Only two measures (PCT and Groups of Nations) were common to all studies; however, scoring of Groups of Nations was considerably modified in the latter two investigations. Inspection of the batteries suggest that Gardiner's correlates tend to be of an intellectual nature, while Vannoy's measures relate to the cognitive structuring of the individual's interpersonal environment (Vannoy, 1965, p. 386). Gardiner (1968, p. 64) comments that Vannoy's battery was largely composed of measures designed to measure the number of dimensions used in handling input, while Gardiner's battery and that utilized with the Edmonton sample have been constructed to include measures of both integrative complexity and dimensionality.

The hypothesis underlying administration of this battery was that factor analysis would identify a number of significant relationships among these measures, paralleling those factors identified by Gardiner (1968). On the basis of the completed factor match, this hypothesis



was supported.

### The Wetaskiwin Study

The Wetaskiwin study was designed to investigate the hypothesis that factor analysis of a battery of conceptual systems measures and correlates (set, agreement response set, impulsivity-reflectivity, religious orientation) would yield a single factor accounting for a large portion of the variance of scores, which would be identified by high loadings of complexity measures.

A principal axes factor analysis (Harman, 1967) was performed and rotated by the varimax criterion (*ibid.*). Table VII presents the intercorrelations between the 12 variables of the Wetaskiwin study. Four eigenvalues greater than one were obtained. The unrotated factor matrix, with the communalities of the variables, is presented in Table VIII. Sums of squares of the loadings for each factor are given, as well as the percentage of common variance and the percentage of total variance accounted for by each factor.

The four factors extracted were then rotated to simple structure by the varimax method (Harman, 1967). These factors are presented in Table IX. As noted earlier, simple structure allows for clearer psychological interpretation of the factors. It was felt that this rotation allowed the best psychological meaning to be obtained from the data.

Interpretation of the Factors. Loadings exceeding  $\pm .300$  on the rotated factors have been interpreted.



TABLE VII

INTERCORRELATIONS BETWEEN COMPLEXITY MEASURES AND CORRELATES:  
WE TASKIWIN SAMPLE

VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12
1 CONCEPTUAL SYSTEMS TEST	1.000											
2 INTERPERSONAL TOPICAL INVENTORY	-000*	1.000										
3 AGREEMENT RESPONSE SET	014	-020	1.000									
4 LATENCY	112	022	054	1.000								
5 ERRORS	-007	-192	-017	-584	1.000							
6 EXCITATION	-095	060	070	-110	085	1.000						
7 EXTINCTION	041	-112	-106	-203	371	-023	1.000					
8 DYNAMISM	031	100	081	259	-451	044	-841	1.000				
9 ROS INTRINSIC SUBSCALE	505	-259	172	-135	207	-053	082	-045	1.000			
10 ROS EXTRINSIC SUBSCALE	005	-147	265	-042	163	025	-053	116	292	1.000		
11 ROS INDISCRIMINATELY PRO - RELIGIOUS	-310	062	036	-131	028	040	-096	134	-410	204	1.000	
12 ROS CHURCH ATTENDANCE	344	-096	161	-040	031	-020	-059	081	698	152	-346	1.000

\* All decimal points omitted except in diagonal.



TABLE VIII

## WETASKIWIN SAMPLE UNROTATED PRINCIPAL AXES FACTOR LOADINGS

VARIABLES	FACTOR LOADINGS				COMMUNALITY
	I	II	III	IV	
1 CONCEPTUAL SYSTEMS TEST	410*	502	-294	092	515
2 INTERPERSONAL TOPICAL INVENTORY	-354	-026	-165	531	436
3 AGREEMENT RESPONSE SET	074	287	457	-149	319
4 LATENCY	-418	430	-378	-411	671
5 ERRORS	618	-457	329	144	719
6 EXCITATION	-036	-095	290	624	484
7 EXTINCTION	580	-575	-275	-183	777
8 DYNAMISM	-584	631	275	148	835
9 ROS INTRINSIC SUBSCALE	741	549	088	032	860
10 ROS EXTRINSIC SUBSCALE	193	206	693	-312	658
11 ROS INDISCRIMINATELY PRO-RELIGIOUS	-417	-361	542	-156	623
12 ROS CHURCH ATTENDANCE	529	618	043	167	691
SUMS OF SQUARES	2.575	2.321	1.591	1.099	7.587
% OF COMMON VARIANCE	33.94	30.59	20.98	14.49	100.00
% OF TOTAL VARIANCE	21.46	19.34	13.16	9.16	63.22

\* All decimal points have been omitted.



TABLE IX

WETASKIWIN SAMPLE ROTATED FACTOR LOADINGS  
(VARIMAX)

	VARIABLES	FACTOR LOADINGS				COMMUNALITY
		I	II	III	IV	
1	CONCEPTUAL SYSTEMS TEST	0.27*	707	-0.51	-107	515
2	INTERPERSONAL TOPICAL INVENTORY	326	-0.84	-470	319	436
3	AGREEMENT RESPONSE SET	170	0.75	5.32	0.39	319
4	LATENCY	432	0.38	-129	-682	671
5	ERRORS	-657	0.30	253	472	719
6	EXCITATION	143	-0.36	-0.72	676	484
7	EXTINCTION	-867	0.32	-1.37	-0.67	777
8	DYNAMISM	899	-0.04	1.63	0.23	835
9	ROS INTRINSIC SUBSCALE	-133	830	388	0.64	860
10	ROS EXTRINSIC SUBSCALE	029	-0.06	809	0.49	658
11	ROS INDISCRIMINATELY PRO-RELIGIOUS	093	-704	316	138	623
12	ROS CHURCH ATTENDANCE	085	780	252	108	691
SUMS OF SQUARES		2.369	2.309	1.606	1.303	7.587
% OF COMMON VARIANCE		31.23	30.43	21.17	17.17	100.00
% OF TOTAL VARIANCE		19.74	19.24	13.38	10.86	63.22

\* All decimal points have been omitted.



Factor 1

Factor one, which accounted for 31.23 per cent of the common variance and 19.74 per cent of the total variance, was defined by the following loadings:

Dynamism of set	.899
Extinction trials	-.867
MFF Errors	-.657
MFF Latency	.432
ITI	.326

Characteristics reflected on this factor are high dynamism (flexibility) of set accomplished in few extinction trials, low MFF errors, moderately high MFF latency, and a tendency toward higher integrative complexity as measured by the ITI. This factor was identified as one of flexibility. Highest loadings were obtained on dynamism or flexibility of set, and Kagan's (1966) construct of reflectivity, defined by low MFF errors in conjunction with high MFF latency. A tendency toward low error scores is again observed in the loading indicating few trials to set extinction, where five consecutive accurate perceptions are required before set is considered extinguished.

Flexibility in decision making situations is an attribute of reflectivity, which Kagan (1966) considers an overt indication of the generation of a number of alternative solutions, and the internal determination of the relative merit of these alternatives prior to responding. Flexibility is also considered by Schroder et al. relative to integrative complexity.



Flexibility of information processing is a somewhat oblique but useful way of measuring the kind of abstract schemata that yield fine discriminations. The less fixed the rules of admission or assignment to the schema are, the more stimuli it should be able to discriminate finely. Fixed admission rules arbitrarily limit the stimuli that can be placed on a dimension. Fixed assignment rules do not permit the use of new information in separating previously undiscriminated stimuli (1967, pp. 178-179).

Flexibility, then, may be conceived of as the mechanism allowing the admission of relevant novel stimuli in achieving dynamism of set, and the generation and consideration of alternatives necessary to establish a reflective style. Schroder et al. (1967, p. 179) report that Scott (1963) found that "'complex' subjects shift the organization and membership of dimensions more than do simpler subjects."

This factor would appear best described as one of flexibility associated with the dimensionality and discrimination qualities of higher integrative complexity.

#### Factor 2

Factor two, which accounted for 30.43 per cent of the common variance and 19.24 per cent of the total variance, obtained the following loadings:

Intrinsic ROS	.830
ROS Church Attendance	.780
CST	.707
IPR	-.704

These loadings describe a factor associated with high rejection of intrinsic religious statements (religious dogma), low church attendance, higher complexity as measured by the CST, and a general



negative attitude toward religious stimuli. This factor was identified as a religious rejection factor, particularly concerning intrinsic beliefs and behaviors, and is associated with higher conceptual systems functioning. The CST as a measure of systems functioning would appear highly grounded in a religious context, reflecting Harvey's (1966, pp. 48-49) orientation towards the importance of religious beliefs in conceptual systems classification. Lower systems classification on the CST is accomplished primarily on the basis of the subject's acceptance of religious stimuli. The assigning of a higher conceptual systems classification on the CST is therefore partially dependent on the rejection of religious stimuli. The loadings obtained on this factor are consonant with Harvey's (1966, p. 49) generalized conclusion that both Systems II and IV tended to disassociate from religious beliefs and participations, but that System IV members tended to exhibit less negativism toward religion than did System II individuals. In contrast to the religious rejection characteristic of lower systems functioning (System II), this factor may be associated with religious independence characteristic of higher functioning (System IV) (Anderson, p. 15).

### Factor 3

Factor three, described by the following loadings, accounted for 21.17 per cent of the common variance and 13.38 per cent of the total variance:

Extrinsic ROS	.809
ARS	.532
ITI	-.470
Intrinsic ROS	.388
IPR	.316



Factor three is defined by high agreement with extrinsic religious items, moderate agreement response set, lower integrative complexity as measured by the ITI, low rejection of intrinsic religious items, and a tendency toward IPR responses. These loadings suggest a factor of acquiescence in both religious and social spheres, coupled with lower integrative complexity. Extrinsic ROS may be construed as an indication of the utility of religion to the individual as a mode of conformity, a crutch, a tranquilizer, or a bid for status (Allport & Ross, 1967, p. 441). It may, as such, serve either a self or social need. Contrarily, intrinsic ROS represents the internalization of religious belief in the conceptual schema of the individual.

Loadings on this factor suggest high acceptance of the utility of religion in conjunction with mild rejection of religious beliefs. In this instance, the tendency toward IPR response patterns may be viewed as an indication of social conformity rather than an indiscriminate acceptance of religious stimuli. This suggestion is commensurate with both lower conceptual systems functioning and social acquiescence. Couch and Keniston (1960) suggest that high agreement response set is associated with extroversion and lack of internalization of standards, reflected in the Extrinsic and Intrinsic ROS values observed on this factor.

Schroder and Harvey (1963, p. 141) note that unilateral training conditions, associated with the development of lower integrative complexity, tend to produce conformity with the demands of the training agent and to, in effect, remove the responsibility for decision making from the individual. Reliance on external rules rather than generating



novel responses in compliance with the changing demands of the situation thus becomes an established characteristic of lower integrative functioning, while creativity in problem solving is an attribute of higher systems functioning (Harvey, Prather, White, & Hoffmeister, 1968; Karlins & Lamm, 1967; Stager, 1967; Tuckman, 1966). Therefore, acceptance of externally imposed behaviors or conformity may be associated with lower integrative complexity, as noted on this factor.

#### Factor 4

Factor four, which accounted for 17.17 per cent of the common variance and 10.86 per cent of the total variance was defined by loadings of:

MFF Latency	-.682
Excitation trials	-.676
MFF Errors	.472
ITI	.319

This factor, through its loadings of low MFF latency and moderately high MFF errors, would appear to be identified as an impulsivity factor in Kagan's (1966) terminology. Impulsivity is here accompanied by high trials to set excitation and by a tendency toward higher complexity as measured by the ITI.

Anderson, Frank, and Nicholson (1969, p. 8) note that impulsive subjects do not condition well, as does Campbell (1968). The finding of a tendency toward complexity on a factor of impulsivity is, however, contrary to expectations. Tuckman (1966, pp. 379-381) has suggested that the ITI, in a study of creativity and cognitive complexity,



appeared to misclassify a number of System I individuals into System III. He concluded that

the ITI is a useful research instrument and reasonable substitute for the SC for identifying System I, II, and IV but is inadequate in its present form for identifying System III (*ibid.*, p. 380).

In line with Tuckman's suggestion, the marginal complexity loading obtained from the ITI on the present factor is subject to question. The factor described appears to be best identified as one of impulsivity. An alternate interpretation of this loading is derived from Kagan's (1966) suggestion that impulsivity may be indicative of minimal concern for errors. Harvey, Hunt, and Schroder (1961, p. 229) note that praise from the task administrator appears to be of greater value to System III individuals than does task success. Impulsivity, in this context, is consonant with higher ITI complexity (System III).

Factor analysis of the Wetaskiwin battery yielded four factors having eigenvalues greater than one; following varimax rotation, the factors were interpreted as describing flexibility, religious rejection, conformity, and impulsivity. Using the CST and ITI as measures of conceptual systems functioning, factor analysis yielded no single factor which could be clearly described as one of complexity. The hypothesis that factor analysis of a battery of conceptual systems measures and correlates (set, agreement response set, impulsivity-reflectivity, religious orientation) would yield a single factor accounting for a large portion of the variance of scores, identified by high loadings of complexity measures, was rejected.

As mentioned previously, the CST and ITI were included in the



battery on the basis of their objectivity and ease of scoring. It is relevant to note, in connection with the negative results of this aspect of the study, that a correlation of -.00 was obtained between the CST and ITI. Bower (1969, p. 69), using the CST and a short form of the ITI devised by Gardiner (1968, p. 115), calculated a correlation of .087 between these measures. It appears that these instruments are assessing conceptual systems functioning in distinct domains.

The other aspect of the Wetaskiwin study involved an examination of a number of postulates regarding conceptual systems functioning and several other personality variables. As a result of the orthogonality observed between the ITI and the CST, each of these proposed relationships was tested independently, with subjects classified into conceptual systems by each measure alternately. In effect, each proposed relationship was tested twice.

Analysis of Variance. One-way analyses of variance were performed on the hypotheses regarding conceptual systems functioning and trials to set excitation, trials to set extinction, agreement response set, ROS intrinsicness, ROS extrinsicness, and ROS church attendance. The following hypotheses were tested through analysis of variance:

A. A significant difference will be found between conceptual systems in trials to set excitation and trials to set extinction.

B. A significant difference will be found between Systems I and II in agreement response set.



- C. A significant difference in church attendance will be found between Systems I and III and Systems II and IV.
- D. A significant difference in intrinsic religious orientation, as measured by the ROS, will be found between conceptual systems.
- E. A significant difference in extrinsic religious orientation, as measured by the ROS, will be found between conceptual systems.

Subjects were first classified into conceptual systems by their ITI scores. Subjects termed unclassifiable on the ITI were not included in these analyses as their data would tend to confound the results. A chi square test for homogeneity of variance (Keeping, 1962, pp. 214-216) was performed on the variances obtained on each construct. The variances are presented in Table X. The assumption regarding homogeneity of variance was not met on trials to set excitation. Although analysis of variance is considered robust in terms of departures from its underlying assumptions, caution must be exercised in interpreting the results obtained under such conditions, particularly when dealing with unequal sample sizes (Edwards, 1960, p. 132; Ferguson, 1966, p. 294; Hayes, 1963, p. 397, Winer, 1962, p. 33). However, the gross departure from the critical level obtained in the analysis of variance of this construct (Table XII) was considered sufficient to warrant some confidence in the finding, although not in the probability level obtained.

Means and standard deviations obtained for each ITI system on each variable tested are presented in Table XI. F ratios and signi-



TABLE X  
HOMOGENEITY OF VARIANCE TESTS:  
ITI CLASSIFICATION

VARIABLES	df (k-1)	CHI SQUARE	P
1 AGREEMENT RESPONSE SET	3	3.285	0.35
2 EXCITATION OF SET	3	40.943	0.00
3 EXTINCTION OF SET	3	.946	0.81
4 ROS INTRINSIC SUBSCALE	3	3.138	0.37
5 ROS EXTRINSIC SUBSCALE	3	.964	0.81
6 ROS CHURCH ATTENDANCE	3	1.422	0.70



TABLE XI  
MEANS AND STANDARD DEVIATIONS: ITI CLASSIFICATION

	VARIABLES	ITI SYSTEMS			
		I	II	III	IV
	N	21	24	29	22
1 Agreement	$\bar{X}$	83.62	76.96	80.07	81.59
	SD	9.61	13.85	12.39	13.89
2 Excitation of Set	$\bar{X}$	2.14	2.96	2.83	2.68
	SD	.65	3.52	2.53	2.61
3 Extinction of Set	$\bar{X}$	23.29	28.46	19.79	22.09
	SD	14.76	14.70	13.09	15.92
4 ROS Intrinsic Subscale	$\bar{X}$	33.57	29.96	28.13	26.95
	SD	7.47	8.68	8.14	10.73
5 ROS Extrinsic Subscale	$\bar{X}$	30.38	28.54	29.00	27.45
	SD	6.34	5.48	5.54	6.41
6 ROS Church Attendance	$\bar{X}$	3.90	3.71	3.21	3.68
	SD	1.37	1.23	1.45	1.59



ficance levels obtained are presented in Table XII. No significant F ratios were obtained using the ITI as a measure of conceptual systems functioning, therefore differences between individual pairs of means were not tested.

The relevant hypotheses were then tested on subjects classified into conceptual systems by their CST scores. Subjects termed unclassifiable on the CST were again excluded from the analyses performed, as their data would tend to confound the results. A chi square test for homogeneity of variance (Keeping, 1962, pp. 214-216) was performed on the variances obtained for each construct. Variances are presented in Table XIII. The assumption regarding homogeneity of variance was not met on trials to set excitation or on extrinsic ROS subscale scores. However, due to the grossness of departures from critical levels observed on the analyses of these constructs, some confidence is placed in the findings obtained under these conditions, although no precise significance is attached to the probability levels reported.

Means and standard deviations obtained for each CST system on each variable tested are presented in Table XIV. F ratios and significance levels obtained are presented in Table XV.

Statistically significant differences were obtained on two variables using the CST as a measure of conceptual systems functioning, ROS intrinsicsness and ROS church attendance. Testing of differences between individual pairs of means was performed on these two findings. Using the Scheffé test for multiple comparisons of means (Winer, 1962, pp. 88-89), the following differences were found among the systems. CST



TABLE XII  
SUMMARY OF ANALYSES OF VARIANCE: ITI CLASSIFICATION

VARIABLES	SOURCE	S.S.	M.S.	df	F	P
1 Agreement Response Set	GROUPS	536.125	178.71	3	1.13	.34
	ERROR	14603.250	158.73	92		
2 Excitation of Set	GROUPS	8.549	2.85	3	0.43	.73
	ERROR	614.441	6.68	92		
3 Extinction of Set	GROUPS	1027.168	342.39	3	1.62	.19
	ERROR	19442.283	211.34	92		
4 ROS Intrinsic Subscale	GROUPS	549.437	183.15	3	2.36	.08
	ERROR	7124.562	77.44	92		
5 ROS Extrinsic Subscale	GROUPS	95.00	31.67	3	0.91	.44
	ERROR	3214.375	34.94	92		
6 ROS Church Attendance	GROUPS	6.856	2.99	3	1.14	.34
	ERROR	184.299	2.00	92		



TABLE XIII  
HOMOGENEITY OF VARIANCE TESTS: CST CLASSIFICATION

VARIABLES	df(k-1)	CHI SQUARE	P
1 Agreement			
Response Set	3	2.412	0.49
2 Excitation			
of Set	3	20.792	0.00
3 Extinction			
of Set	3	.667	0.88
4 ROS Intrinsic			
Subscale	3	1.146	0.77
5 ROS Extrinsic			
Subscale	3	12.972	0.01
6 ROS Church			
Attendance	3	2.997	0.39



TABLE XIV  
MEANS AND STANDARD DEVIATIONS: CST CLASSIFICATION

	VARIABLES	CST SYSTEMS			
		I	II	III	IV
	N	34	18	30	10
1 Agreement	$\bar{X}$	79.68	86.67	80.20	81.00
	SD	12.81	9.22	11.20	12.76
2 Excitation of Set	$\bar{X}$	2.81	3.28	2.40	2.30
	SD	2.40	4.04	2.19	.95
3 Extinction of Set	$\bar{X}$	23.03	20.06	24.67	23.60
	SD	14.61	12.93	15.88	13.09
4 ROS Intrinsic Subscale	$\bar{X}$	21.76	33.78	34.00	31.10
	SD	7.39	6.03	7.40	6.44
5 ROS Extrinsic Subscale	$\bar{X}$	28.47	31.78	29.43	27.90
	SD	7.70	3.77	4.95	4.65
6 ROS Church Attendance	$\bar{X}$	2.74	4.39	3.87	4.10
	SD	1.42	.98	1.36	1.20



TABLE XV  
SUMMARY OF ANALYSES OF VARIANCE: CST CLASSIFICATION

VARIABLE	SOURCE	S.S.	M.S.	df	F	P
1 Agreement	GROUPS	645.000	215.00	3	1.58	.20
Response Set	ERROR	11964.312	135.96	88		
2 Excitation	GROUPS	11.298	3.77	3	0.54	.66
of Set	ERROR	614.441	6.98	88		
3 Extinction	GROUPS	242.839	80.95	3	0.37	.77
of Set	ERROR	19200.988	218.19	88		
4 ROS Intrinsic	GROUPS	2983.500	994.50	3	19.97	.000001
Subscale	ERROR	4382.187	49.80	88		
5 ROS Extrinsic	GROUPS	153.500	51.17	3	1.45	.23
Subscale	ERROR	3105.938	35.29	88		
6 ROS Church	GROUPS	41.205	13.74	3	8.10	.00008
Attendance	ERROR	149.262	1.70	88		



System I was the most intrinsic group on the ROS ( $p < .01$ ) and attended church more frequently as indicated by the ROS ( $p < .05$ ). Probability matrices for Scheffé multiple comparisons of means on ROS intrinsicness and ROS church attendance are presented in Tables XVI and XVII.

None of the hypotheses under test by analysis of variance could be accepted without reservation. Using ITI classifications as a measure of conceptual systems functioning, no statistically significant differences were found between systems on any variable. With reference to ITI systems, therefore, all stated hypotheses were rejected.

However, orthogonality observed between the ITI and CST as measures of conceptual systems functioning necessitated the performance of two series of analyses of variance. Using CST classifications as a measure of conceptual systems functioning, statistically significant differences were obtained between systems on ROS intrinsicness and ROS church attendance. (See Table XV.)

Lack of agreement between the analyses of variance performed using ITI systems and CST systems suggests that interpretation of these results must be approached with caution. The hypotheses suggesting the existence of significant differences between conceptual systems on measures of trials to set excitation, trials to set extinction, agreement response set, and ROS extrinsicness received no significant levels of support using either the ITI or CST as a measure of conceptual functioning. These hypotheses were, therefore, rejected.

The hypothesis regarding church attendance, however, demands



TABLE XVI

PROBABILITY MATRIX FOR SCHEFFÉ MULTIPLE COMPARISON OF MEANS:  
CST CLASSIFICATION-ROS INTRINSIC SUBSCALE

CST SYSTEM

	I	II	III	IV
I	1.000	.000	.000	.006
II		1.000	.999	.819
CST SYSTEM	III		1.000	.738
	IV			1.000

TABLE XVII

PROBABILITY MATRIX FOR SCHEFFÉ MULTIPLE COMPARISON OF MEANS:  
CST CLASSIFICATION-ROS CHURCH ATTENDANCE

CST SYSTEM

	I	II	III	IV
I	1.000	.001	.010	.043
II		1.000	.615	.957
CST SYSTEM	III		1.000	.971
	IV			1.000



further examination. It was proposed that significant differences in church attendance, as measured by the ROS, would exist between Systems I and III and Systems II and IV. A Scheffé test following a significant F ratio on this variable revealed that CST System I individuals attended church significantly more frequently than did members of any other CST system ( $p < .05$ ). Inspection of Table XIV reveals that the order of frequency of church attendance among CST systems is I, III, IV, and II, in agreement with Harvey's findings (Harvey, 1966, pp. 48-49). These findings, using the CST as a measure of conceptual systems functioning, lend partial support to the hypothesis. However, the finding of no significant differences on church attendance between ITI systems leads one to question the generality of this finding as regards other measures of conceptual systems functioning. Caution appears particularly advisable as the CST, on which differences were found, appears to be a religiously oriented measure of conceptual systems functioning. Under these conditions, the hypothesis regarding church attendance, as stated, could not be accepted.

The hypothesis that significant differences in intrinsicness, as measured by the ROS, would be found between conceptual systems also received some support. The analysis of variance on intrinsicness using the CST yielded a significant F ratio ( $p < .01$ ). A Scheffé test for multiple comparisons of means revealed that CST System I was significantly more intrinsic in religious orientation as measured by the ROS than was any other CST system. The hypothesis, as stated, was therefore accepted using the CST as a measure of conceptual systems functioning.



Chi Square. Several hypotheses were formulated regarding conceptual systems functioning and a number of other variables yielding nominal data. These hypotheses concerned dynamism of set, reflectivity, impulsivity, intrinsic religious orientation, extrinsic religious orientation, and indiscriminately pro-religious orientation. The following hypotheses were tested through one sample chi square tests (Siegel, 1956, pp. 42-47):

- F. The greatest proportions of subjects classified as possessing dynamic sets will be found in Systems III and IV.
- G. The greatest proportions of subjects classified as reflective will be found in Systems III and IV.
- H. The greatest proportions of subjects classified as impulsive will be found in Systems I and II.
- I. The greatest proportion of subjects classified as intrinsically religious will be found in System I.
- J. The greatest proportion of subjects classified as extrinsically religious will be found in System III.
- K. The greatest proportion of subjects classified as indiscriminately pro-religious will be found in System I.

Each hypothesis was tested twice due to the orthogonality observed between the conceptual systems measures employed. Results obtained will be presented, first in reference to ITI classification, then in reference to CST classification. Subjects termed unclassi-



fiable on each instrument were excluded from the series of chi square tests relative to that measure, as inclusion of their data might tend to confound the results.

The hypotheses were first tested using ITI classifications. Table XVIII presents the numbers of subjects along each variable, by ITI systems, as well as the chi square values and probability levels obtained for these distributions.

None of the chi square values calculated approached significance with the exception of the test performed on dynamic set ( $p < .10$ ). Although a critical probability level of .05 or less is generally considered appropriate for tests of significance, the obtained probability appeared sufficient to demand some consideration. The partitioned chi square for dynamic set is presented in Table XIX. Inspection of this table reveals that the majority of individuals exhibiting dynamic sets were found in ITI System III.

The hypotheses were then tested using CST classifications. Table XX presents the numbers of subjects within each CST system represented on the variables being examined, as well as the chi square values and probability levels obtained for these distributions.

One sample chi square tests, using CST systems, yielded significant probability levels on individuals classified as impulsive by the MFF ( $p < .02$ ), intrinsic by the ROS ( $p < .001$ ), extrinsic by the ROS ( $p < .05$ ), and indiscriminately pro-religious by the ROS ( $p < .001$ ). Partitioned chi squares for these variables are presented in Tables XXI, XXII, XXIII, and XXIV.

Inspection of Table XXI indicates that the majority of impulsive individuals, as classified by the MFF, tend to be found in CST



TABLE XVIII  
SUMMARY OF CHI SQUARE TESTS: ITI CLASSIFICATION

VARIABLES	ITI SYSTEMS						$\chi^2$	P*
	I	II	III	IV	N	df		
1 Dynamic Set	13	11	24	14	62	3	6.515	<.10
2 Reflective	6	9	12	9	36	3	2.000	<.70
3 Impulsive	10	9	7	8	34	3	.586	<.90
4 Intrinsic	3	7	11	8	29	3	4.515	<.30
5 Extrinsic	9	6	6	7	28	3	.855	<.90
6 Indiscriminately Pro-Religious	2	2	4	3	11	3	.998	<.90

\* Two tailed test.



TABLE XIX  
DYNAMIC INDIVIDUALS BY ITI SYSTEM

ITI	O	E	PARTITIONED $\chi^2$
I	13	15.5	.403
II	11	15.5	1.306
III	24	15.5	4.661
IV	14	15.5	.145
N =	62	62	$\chi^2 = 6.515$



TABLE XX  
SUMMARY OF CHI SQUARE TESTS: CST CLASSIFICATION

VARIABLES	CST SYSTEMS						$\chi^2$	P*
	I	II	III	IV	N	df		
1 Dynamic Set	22	14	16	9	61	3	5.686	< .20
2 Reflective	9	7	11	6	33	3	2.825	< .50
3 Impulsive	13	4	12	3	30	3	10.250	< .02
4 Intrinsic	19	1	4	4	28	3	28.283	< .001
5 Extrinsic	5	9	12	2	28	3	8.284	< .05
6 Indiscriminately Pro-Religious	10	0	2	9	12	3	22.666	< .001

\* Two tailed test.



TABLE XXI  
IMPULSIVE INDIVIDUALS BY CST SYSTEM

CST	O	E	PARTITIONED $\chi^2$
I	13	8	3.125
II	4	8	2.000
III	12	8	2.000
IV	3	8	3.125
N =	32	32	$\chi^2 = 10.250$

TABLE XXII  
INTRINSIC INDIVIDUALS BY CST SYSTEM

CST	O	E	PARTITIONED $\chi^2$
I	19	7	20.571
II	1	7	5.142
III	4	7	1.285
IV	4	7	1.285
N =	28	28	$\chi^2 = 28.283$



TABLE XXIII  
EXTRINSIC INDIVIDUALS BY CST SYSTEM

CST	O	E	PARTITIONED X <sup>2</sup>
I	5	7	.571
II	9	7	.571
III	12	7	3.571
IV	2	7	3.571
N =	28	28	X <sup>2</sup> = 8.284

TABLE XXIV  
INDISCRIMINATELY PRO-RELIGIOUS INDIVIDUALS BY CST SYSTEM

CST	O	E	PARTITIONED X <sup>2</sup>
I	10	3	16.333
II	0	3	3.000
III	2	3	.333
IV	0	3	3.000
N =	12	12	X <sup>2</sup> = 22.666



Systems I and III, while the minority of impulsive individuals tend to be found in Systems II and IV. Table XXII suggests that the majority of intrinsic individuals, as classified by the ROS, tend to be found in CST System I and the minority in System II. Table XXIII indicates that the majority of extrinsic individuals, as classified by the ROS, tend to be found in CST System III, while the minority tend to be found in System IV. Finally, inspection of Table XXIV indicates that the majority of individuals classified as indiscriminately pro-religious on the ROS tend to be found in CST System I.

In reference to the small expected frequencies observed in Table XXIV, Siegel (1956, p. 46) suggests that a one sample chi square test may not be appropriately utilized when expected frequencies are less than five. However, Ferguson (1966, pp. 207-208) suggests that a chi square test may be satisfactorily employed whenever expected frequencies exceed two, provided degrees of freedom are greater than one. He states the limitation that small expected frequencies in conjunction with a few degrees of freedom will permit the estimation of roughly approximate probabilities. Ferguson's criterion has been met in regards to Table XXIV; therefore, the finding of a significant chi square value will be accepted, however, the probability level calculated will be viewed with caution.

None of the hypotheses being tested by chi square could be accepted without reservation. Using ITI as a measure of conceptual systems functioning, no statistically significant values were found on any variable. The chi square test on dynamic set yielded a probability level of less than .10. Inspection of the partitioned chi square on dynamic set



suggested that the majority of subjects exhibiting dynamic sets were found in ITI System III, but the probability level obtained was not sufficient to support the hypothesis that the greatest proportions of subjects possessing dynamic sets would be found in Systems III and IV. With reference to ITI systems, therefore, all stated hypotheses were rejected.

Using CST classifications as a measure of conceptual systems functioning, statistically significant probability levels were obtained on individuals classified as impulsive on the MFF, intrinsic by the ROS, extrinsic by the ROS, and indiscriminately pro-religious by the ROS.

The hypothesis regarding impulsivity was that the greatest proportions of subjects classified as impulsive would be found in Systems I and II. Inspection of Table XXI, however, indicates that the majority of individuals classified as impulsive were found in CST Systems I and III. Harvey, Hunt, and Schroder (1961, p. 212) state that "ambiguity produces potential refutation in System I." Therefore, System I individuals might tend to view the MFF test, a high-ambiguity situation, as threatening, and, in this instance, attempt to escape through responding quickly. The finding that a large portion of impulsive individuals tend to be System III apparently has a different basis.

Harvey, et al. suggest that

Persons functioning in terms of system III will not necessarily experience refutation from poor performance or making errors provided that such responses are deemed praiseworthy by the valued other person ... if confronted by negative task feedback (failure) that conflicts with positive source evaluation (praise), the person functioning in system III is more susceptible to the latter ... (1961, p. 229).



Impulsivity on the MFF exhibited by a System III individual might therefore be interpreted as a performance directed toward the examiner rather than toward the task itself.

The finding that a large portion of impulsive individuals, as classified by the MFF, belonged to CST System I lends partial support to the stated hypothesis. However, due to discrepant findings on this variable using ITI and CST systems, the null-hypothesis could not be rejected.

A significant chi square value was also obtained on intrinsic religious orientation measured by the ROS. Inspection of Table XXII indicates that the majority of intrinsic individuals tend to be found in CST System I and the minority in System II. The hypothesis that the greatest proportion of subjects classified as intrinsically religious would be found in System I was therefore accepted, in reference to CST functioning.

Extrinsic religious orientation as measured by the ROS also yielded a significant probability level via a chi square test. Table XXIII reveals that the majority of extrinsic individuals tend to be found in CST System III and the minority in System IV. The hypothesis that the greatest proportion of subjects classified as extrinsically religious would be found in System III was therefore accepted in reference to CST systems.

The chi square test on individuals classified as indiscriminately pro-religious also yielded a significant probability level. Inspection of Table XXIV indicates that the majority of ROS indiscriminately pro-



religious individuals tend to be found in CST System I. The hypothesis that the greatest proportion of subjects classified as indiscriminately pro-religious would be found in System I was accepted, in reference to CST systems.

Using the CST as a measure of conceptual systems functioning, significant differences have been found on three ROS categories, intrinsic religious orientation, extrinsic religious orientation, and indiscriminately pro-religious orientation, in the directions hypothesized. The generality of these findings appears subject to question, as equivocal results were obtained using ITI systems. The relevant hypotheses have been accepted, therefore, only as they pertain to CST functioning.

A summary of hypotheses accepted and rejected is presented in Table XXV.

On the suggestion of Hunt (1969b) a supplementary chi square analysis was performed in keeping with Bayes' theorem (Hayes, 1963, pp. 114-115). The results of this analysis are summarized in Tables XXVI and XXVII. The procedure used corrects the E values in proportion to the distribution of the sample for both ITI and CST classifications (see Tables XI and XIV). In this instance the main effect of such a correction was apparently that of making the chi square tests more rigorous. However, it was argued that this procedure would tend to increase the probability of committing a Type II error (Siegel, 1956, p. 9). As a result, the approach described by Siegel (*ibid.*, pp. 42-47), assuming equal E values under the null hypothesis, was implemented and interpreted.



TABLE XXV  
SUMMARY OF HYPOTHESES ACCEPTED AND REJECTED

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H<sub>1</sub> -- Accepted

H<sub>2</sub> -- Rejected

H<sub>3</sub> -- Tested each part using both ITI and CST as measures  
of conceptual systems functioning, due to orthogonality of the measures ( $r = -.00$ )

ITI CLASSIFICATION

- A. rejected
- B. rejected
- C. rejected
- D. rejected
- E. rejected
- F. rejected
- G. rejected
- H. rejected
- I. rejected
- J. rejected
- K. rejected

CST CLASSIFICATION

- A. rejected
- B. rejected
- C. rejected
- D. accepted
- E. rejected
- F. rejected
- G. rejected
- H. rejected
- I. accepted
- J. accepted
- K. accepted

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TABLE XXVI

SUMMARY OF CHI SQUARE TESTS:  
ITI CLASSIFICATION USING PROPORTIONAL E VALUES

VARIABLES	ITI SYSTEMS					df	$\chi^2$	P*
	I	II	III	IV	N			
1. Dynamic Set	13	11	24	14	62	3	2.80	<.50
2. Reflective	6	9	12	9	36	3	.63	<.90
3. Impulsive	10	9	7	8	34	3	1.96	<.70
4. Intrinsic	3	7	11	8	29	3	2.62	<.50
5. Extrinsic	9	6	6	7	28	3	2.25	<.70
6. Indiscriminately Pro-religious	2	2	4	3	11	3	.50	<.95

\* two tailed test

TABLE XXVII

SUMMARY OF CHI SQUARE TESTS:  
CST CLASSIFICATION USING PROPORTIONAL E VALUES

VARIABLES	CST SYSTEMS					df	$\chi^2$	P*
	I	II	III	IV	N			
1. Dynamic Set	22	14	16	9	61	3	1.98	<.70
2. Reflective	9	7	11	6	33	3	2.52	<.50
3. Impulsive	13	4	12	3	30	3	1.45	<.70
4. Intrinsic	19	1	4	4	28	3	14.07	<.01
5. Extrinsic	5	9	12	2	28	3	6.28	<.10
6. Indiscriminately Pro-religious	10	0	2	9	12	3	11.56	<.01

\* two tailed test



TABLE XXVIII  
INTRINSIC INDIVIDUALS BY CST SYSTEM  
USING PROPORTIONAL E VALUES

CST	O	E	PARTITIONED $\chi^2$
I	19	10.35	7.23
II	1	5.48	3.66
III	4	9.13	2.88
IV	4	3.04	.30
	28	28.00	$\chi^2 = 14.07 \text{ p} < .01$

TABLE XXIX  
INDISCRIMINATELY PRO-RELIGIOUS INDIVIDUALS BY CST SYSTEM  
USING PROPORTIONAL E VALUES

CST	O	E	PARTITIONED $\chi^2$
I	10	4.43	6.98
II	0	2.35	2.34
III	2	3.92	.94
IV	0	1.30	1.30
	12	12.00	$\chi^2 = 11.56 \text{ p} < .01$



Regarding the hypotheses accepted and rejected (Table XXV), the following changes would be suggested under the second chi square procedure. No significant differences among systems were found on any variable using ITI classifications. Using CST classifications, significant differences were found among systems on intrinsic ROS and IPR. The results of these chi squares are presented in Tables XXVIII and XXIX. Contrary to the former analysis, no significant difference was obtained among CST systems on extrinsic ROS.



## CHAPTER VI

### SUMMARY AND DISCUSSION

The present study was designed to examine further Gardiner's (1968) contention that communality exists among conceptual systems measures and to investigate a number of theoretical relationships discerned between conceptual systems functioning and other personality models. Batteries of conceptual systems measures and correlates were administered to two samples of grade 11 students. The Edmonton sample was used to assess the communality among a number of conceptual systems measures selected from a larger battery by Gardiner (1968). Tentative evidence of the existence of factors representing integrative complexity and intradimensional discrimination within this battery was obtained through factor analysis followed by a satisfactory factor match to Gardiner's data. (See Table VI.) The conceptual systems measures used were the Interpersonal Topical Inventory (ITI), the Paragraph Completion Test (PCT), the This I Believe Test (TIB), and the Groups of Nations test. Significant intercorrelations were obtained between the TIB and PCT (.408) and between the TIB and Groups of Nations test (.206). An intercorrelation significant at the .10 level was obtained between the Revised ITI and PCT (.167). Schroder et al. (1967, p. 115) suggest that a low order relationship exists between the TIB and PCT as the latter measure is scored largely on a content basis. However, it is interesting to note that, in both the present study and that of Gardiner (1968), the TIB-PCT intercorrelation has been the highest obtained between the conceptual systems measures administered. This finding leads one to concur with Schroder



et al. (1967, p. 204) that the "relationship between conceptual-level scores based on ... objective measures and on sentence response is significant but low." In construct validity studies, projective measures of system functioning have consistently proved to be more adequate instruments (*ibid.*).

The second aspect of the study, although primarily concerned with correlates of cognitive functioning, provided the further information that the ITI and CST as objective measures of system functioning appear orthogonal ( $r = -.00$ ). Bower (1969) concurs in this finding ( $r = .087$ ), supporting the contention that valid and reliable bases of conceptual systems classification are a primary need in the area.

Conceptual systems level is not considered as a global trait of the individual's functioning due to the influences of heterogeneous training agents and training environments on the individual's cognitive development (Schroder et al., 1967, p. 129). Schroder et al. (*ibid.*) comment that "measurements should be directed toward the specific content area relevant to one's interests" and also note that structure in a given area is not fixed, but varies according to the situation. Crouse, Karlins, and Schroder (1968, p. 645) suggest that variations in functional level may exist even within the interpersonal domain which the standard instruments are purported to assess.

Schroder et al. (1967, pp. 23-28) comment that level of integrative complexity exhibited by an individual in any specific domain is dependent upon three interrelated components of functioning: differentiation, discrimination, and integration. Working from this conceptual model, Schroder et al. (1967, pp. 179-184) have suggested that multidimensional scaling of subjects' responses in a similarity judgment situation will



allow for the consideration of more than one aspect of integrative complexity. Using the same theoretical framework, Driver and Streufert (1967) have devised the Purdue-Rutgers Prior Experience Inventory to assess a variety of aspects of complexity, including differentiation, flexibility, openness, general complexity, and several sub-types of complexity (Coates, 1968, p. 89). The other extreme, devising a restricted domain specific instrument, has been employed by Crouse, Karlins, and Schroder (1968). Another approach to assessing conceptual level is that of attaining a composite score from a number of measures (Joyce, Lamb, & Sibol, 1966).

The factor analysis of the Edmonton battery lends some support to Schroder's model of integrative complexity consisting of three components (discrimination, differentiation, integration). However, it is suggested that further research into conceptual systems functioning must closely examine the available instruments. An efficacious approach to the problem of classification, if this aim is judged desirable, might encompass the administration of a battery of complexity and conceptual systems measures and the derivation of a multidimensional scoring system to effect systems classification.

This is not, however, meant to decry the work being done by varied investigators in the area, as no principal theorist has maintained that his particular instrument can be feasibly applied to classification irrespective of domain.

The finding of orthogonality between at least two measures necessitates (a) more intensive investigation of the psychometric aspects of conceptual systems functioning and (b) a more intensive



examination of the theoretical positions from which varied instruments emanate. Problems of measurement have also been noted by Bower (1969), Streufert and Driver (1967), and Vannoy (1965).

Several theorists and researchers in the area, although not always in complete agreement, have described conceptual systems levels in terms of cognitive and behavioral characteristics associated with various systems (Anderson, 1969; Cross, 1967; Harvey, 1966; Harvey, Hunt, & Schroder, 1961; Hunt, 1966a; Schroder et al., 1967, Wolfe, 1963). A more comprehensive and unitary theoretical formulation than is presently apparent will evolve only as greater amounts of empirically derived evidence differentiating between systems functioning becomes available. In this regard, the present study was concerned with examining the relationships between conceptual systems functioning and a number of other personality variables in an attempt to ascribe particular modes of functioning to differing systems.

Factor analysis of the Wetaskiwin battery revealed a factor of flexibility associated with higher systems functioning on the ITI, supporting the statement of Schroder et al. (1967, pp. 178-179) to this effect. A factor of religious independence was identified, associated with higher CST functioning, suggesting freedom from religious dogma rather than negativism. Disagreement with intrinsic religious items on the ROS in conjunction with higher CST functioning is consonant with Harvey's (1966, p. 46) position that System IV individuals, in particular, develop their own standards rather than internalizing those of others. As Anderson (1969, p. 15) comments, "That they are disproportionately disinterested in conventional religion makes sense in



terms of their dislike of arbitrary authority."

A conformity factor was found to be associated with lower integrative complexity as measured by the ITI which was assumed to be a consequence of the demands of unilateral training environments (Schroder & Harvey, 1963, p. 141). Consequently, the System I individual is described as "dictatorial and inflexible, relying heavily on rules, however outdated, provided by some superior authority (Anderson, 1969, p. 13)."

Contrary to expectations, impulsivity as measured by the MFF was found associated with higher conceptual systems functioning on the ITI and with low conditionability as indicated by low excitability of set. Impulsivity and low conditionability have previously been empirically related by Anderson, Frank, and Nicholson (1969) and by Campbell (1968). Uznadze comments that, in this case,

we may assume that we are dealing with persons lacking in internal directing power, and apparently entirely under the control of outside impressions, and thus distinguished by their extreme extraversion (1966, p. 49).

Impulsivity in conjunction with high external control, as suggested here, would be expected to be associated with lower systems functioning (Anderson, 1968, p. 11; Kagan et al., 1966, p. 594).

Tuckman's (1966, pp. 379-381) comments regarding the validity of System III classifications obtained on the ITI plus the marginal significance of the ITI loading on this factor lead one to question this loading. We have again returned to the problem of instrumentation. Alternatively, Kagan (1966) has suggested that impulsivity may be an overt indication of a strong need to chance quick success



dominating a lesser anxiety over errors. Employing this orientation, higher ITI conceptual systems associated with impulsivity may be attributed to the presence of System III functioning, where praise from the test administrator is of greater importance than is task success (Harvey, Hunt, & Schroder, 1961, p. 229).

The other aspect of the Wetaskiwin study concerned the investigation of a number of personality dimensions in relation to conceptual systems functioning. In this regard, a number of behaviors appeared relevant to CST functioning; however, none of the proposed variables appeared to discriminate at a significant level between ITI systems. It would appear, then, that the CST and ITI are tapping different aspects of functioning within the same domain and, to a large extent, reflect the diverging interests of their authors.

A Scheffé test for multiple comparisons of means following the finding of a significant F ratio indicated that CST System I was significantly more intrinsic in religious orientation as measured by the ROS than was any other CST system ( $p < .01$ ), as hypothesized (Table XVI). A second Scheffé test revealed that CST System I individuals attended church significantly more frequently than did individuals of any other CST system ( $p < .05$ ). The order of frequency of church attendance was found to be CST System I, III, IV, and II (Table XVII), supporting Harvey's (1966, pp. 48-49) earlier finding.

Using ITI systems for these same subjects, no significant differences were obtained on these variables. This finding suggests that the CST is particularly sensitive to religious orientation in



its evaluation of systems functioning, while the ITI appears to be more concerned with other conceptual domains of interpersonal perceptions. None of the proposed relationships between conceptual systems functioning and trials to set excitation, trials to set extinction, agreement response set, and extrinsic ROS received statistical support using either ITI or CST classifications.

A second set of variables, yielding nominal data, were related to conceptual systems functioning. Using the ITI as the conceptual systems measure, dynamic set was significant at the .10 level. The majority of individuals classified as exhibiting dynamic set appeared to be in ITI System III (Table XIX), suggesting that dynamism of set tends to be associated with higher conceptual functioning as measured by the ITI. Using CST systems, significant differences among systems were found in individuals classified as impulsive on the MFF ( $p < .02$ ), intrinsic on the ROS ( $p < .001$ ), extrinsic on the ROS ( $P < .05$ ), and indiscriminately pro-religious on the ROS ( $p < .001$ ). Table XXI reveals that the majority of impulsive individuals on the MFF tend to be found in CST Systems I and III, and the minority in Systems II and IV. It was hypothesized, on the basis of their lower information processing skills (Schroder et al., 1967, pp. 14-23) that most impulsive individuals would be found in Systems I and II. Relevant to the finding, Schroder and Harvey (1963, p. 161) state that System III individuals tend to fail to achieve a task orientation due to their strong tendency to yield to the expectations of others; that is, they are more concerned with gaining acceptance from others than they are with task success. On a differing basis, System I individuals actively seek external controls for behavior and follow the explicit or implicit sug-



gestions of other people, particularly those individuals construed as authority figures in certain situations. Schroder and Harvey describe System I functioning in this manner:

When forced to deal with ambiguity, he relies heavily upon definitions brought from past situations and, to escape the stress of the unstructured, closes inappropriately fast on a solution (1963, p. 153).

Consequently, the finding that impulsive individuals as classified by the MFF tend to be found in CST Systems I and III may be interpreted as a function of the described characteristics of these systems, rather than being related to information processing levels per se.

Inspection of Table XXII confirmed the earlier finding that CST System I tended to be the most intrinsic on the ROS, and also indicated that the minority of intrinsic individuals tended to be found in CST System II. This concurs with Harvey's statement (1966, pp. 48-49) that System I individuals are the most religious and System II individuals the least.

The majority of individuals classified as extrinsic on the ROS were found in CST System III and the minority in System IV (Table XXIII). This finding supports the suggestion that System III individuals, in particular, are oriented toward others, not in the dependency model of System I, but in a utilitarian sense.

While oriented toward establishing dependencies on others to avert the helplessness that would result from being placed on his own, the System III representative nonetheless develops more autonomous internal standards, especially in the social sphere, than does the System I individual (Harvey, 1966, p. 45).

In contrast, individuals of System IV are most independent of



external standards and controls.

More than persons of any of the other systems, the System IV individual has a set of internal standards that are more truly independent of external criteria (Harvey, 1966, P. 46).

The finding that the majority of individuals classified as indiscriminately pro-religious tend to be found in CST System I (Table XXIV) supports the hypothesis to that effect. This lends support to Harvey's statement that System I individuals are the most religious (1966, p. 49) and that lower conceptual systems functioning tends to be associated with categorical thinking (Harvey, 1967, p. 206), resulting in the indiscriminate acceptance of religious statements.

These four findings were again unsupported by ITI results, bringing one to again suggest that the ITI and CST are measuring different aspects of conceptual systems functioning. This contention is strongly supported by the finding of an orthogonal relationship between the ITI and CST in the Wetaskiwin factor analysis.

The relationships examined between conceptual systems functioning and a number of other personality dimensions were examined both by factor analysis and by less inclusive statistical techniques. Factor analysis revealed that flexibility and impulsivity were associated with higher ITI system functioning, and conforming with lower ITI functioning. Religious independence was associated with higher CST functioning. Other analyses revealed that CST System I individuals attend church significantly more often and are significantly more intrinsic in religious orientation, as measured by the ROS, than any other CST system. Analyses of nominal data indicated a trend for dynamism of set to be associated with higher ITI functioning.



Significant differences among CST systems were found on individuals classified as impulsive on the MFF, and intrinsic, extrinsic, and indiscriminately pro-religious on the ROS.

The only variable which appeared related to both ITI and CST systems functioning was impulsivity. However, factor analysis indicated that impulsivity was associated with higher ITI functioning while a chi square test suggested that impulsive individuals tended to be found in CST System I and III. Differences between ITI systems were insignificant, which again implies some discrepancies between ITI and CST functioning. The factor associating flexibility with higher ITI functioning was supported by the further suggestion that dynamism (flexibility) of set tended to be exhibited by individuals of higher ITI systems.

Generally, characteristics of impulsivity, flexibility, and conformity were associated with ITI functioning, or integrative complexity levels, while a number of religious orientations were found to be associated only with CST functioning. Two conclusions appear to be derived from this summary, (a) the ITI and CST are assessing conceptual systems functioning differently and (b) no necessary relationship exists between their domains of functioning. The latter suggestion would appear to be of particular relevance, as it implies that a disparity rather than a difference exists between at least two psychometric approaches to systems functioning. Future investigators in the area would be wise to select instruments relevant to the particular theoretical formulation they prefer to adopt.



The present study reported evidence that a low order relationship exists between set and conceptual systems functioning on the ITI; however the concept of 'flexibility' of set relative to conceptual systems merits further investigation. It is suggested that the results obtained may be at least partially attributable to the type of set task administered. Harvey (1966, pp. 54-56) reports a number of consistent findings obtained from studies incorporating a variety of set situations with individuals of differing conceptual levels. Natadze (1969, p. 621) suggests that "set based on psychological representations lying outside the range of perception explore a form of set specific for man, based on 'the second plane' of activity." These types of set are largely verbally induced and appear somewhat analogous to those set tasks described by Harvey. The haptic modality set task (Uznadze, 1966) may be, on the other hand, largely restricted in its influence to the first, or impulsive, plane of behavior (Natadze, 1969, p. 621). Consequently the expected relationships, proposed to exist on the second plane, were not exhibited.

The findings of the present study concerning Kagan's (1966) construct of impulsivity-reflectivity as a response style relative to conceptual systems functioning are ambiguous. Perhaps further research in this area should incorporate the possible four-fold classification of subjects by the response latency and response error medians. The MFF would again appear to be largely restricted to the 'first plane' of behavior while conceptual systems classifications involve the verbal functioning of the individual. Kagan et al. (1964) describe a variety of information processing tasks relative to the



reflectivity-impulsivity dimension in children; however, none of these, at present, appear to have been utilized with adults with the exception of the MFF.

None of the results concerning the relationship of agreement response set (Couch & Keniston, 1960) to conceptual systems functioning were significant. Mahler (1962, p. 318) comments that the Agreement Response Scale was standardized on a male sample and consequently may not be equally applicable to female subjects. This suggestion may be worthy of further investigation.

The construct of conceptual systems functioning has received some empirical support from this study, however, the problem of measurement appears to be of importance. Despite current methodological problems, the conceptual systems theory has applicability to education. Of particular relevance is the work of Hunt (1964; 1965; , 1966a; 1966b; 1967; 1968) and his colleagues (Hunt & Dopyera, 1966; Hunt & Hardt, 1967; Hunt & Joyce, 1967) as their goal is the practical application of conceptual systems theory to teacher training and classroom management. Harvey, White, Prather, Alter, and Hoffmeister (1966) and Hunt and Joyce (1967) found that teachers of differing conceptual levels exhibited different teaching styles. Hunt (1966b) proposes that a theoretical knowledge of conceptual systems functioning is advantageous in that a teacher may predict the behavior of a student or group of students in certain training environments, and may, as a training agent, effect specific desired behaviors and conceptual change through appropriate structuring of the environment. This type of educational intervention is termed a



conceptual systems change model and is defined as

A set of conditional statements indicating the environmental condition specifically appropriate for an organism of a specified state in order to produce structural change toward a particular desired state (Hunt, 1966a, p. 278).

Basically, the extended goal of the conceptual systems change model is to enhance the development of abstraction and adaptability in students' behaviors (*ibid.*, p. 389) through matching homogeneous conceptual systems groups to optimal educational environments (*ibid.*, p. 291). Hunt and Hardt suggest that

Low CL students, because of their relatively concrete orientation should function best and be more likely to change when the program approach is clearly structured and the students know what to expect. By contrast, high CL students who are more inquiring and more independent should function best and be more likely to change in a reflective environment which is more flexibly attuned to their independent orientation (1967, p. 5).

Joyce and Harootunian (1967) have also considered the need for flexibility in education in a theory of teaching behavior. As yet, the utility of the change model has not been extensively researched (Hunt, 1966a, p. 292), but the implications are indeed of great importance (Anderson, 1968).



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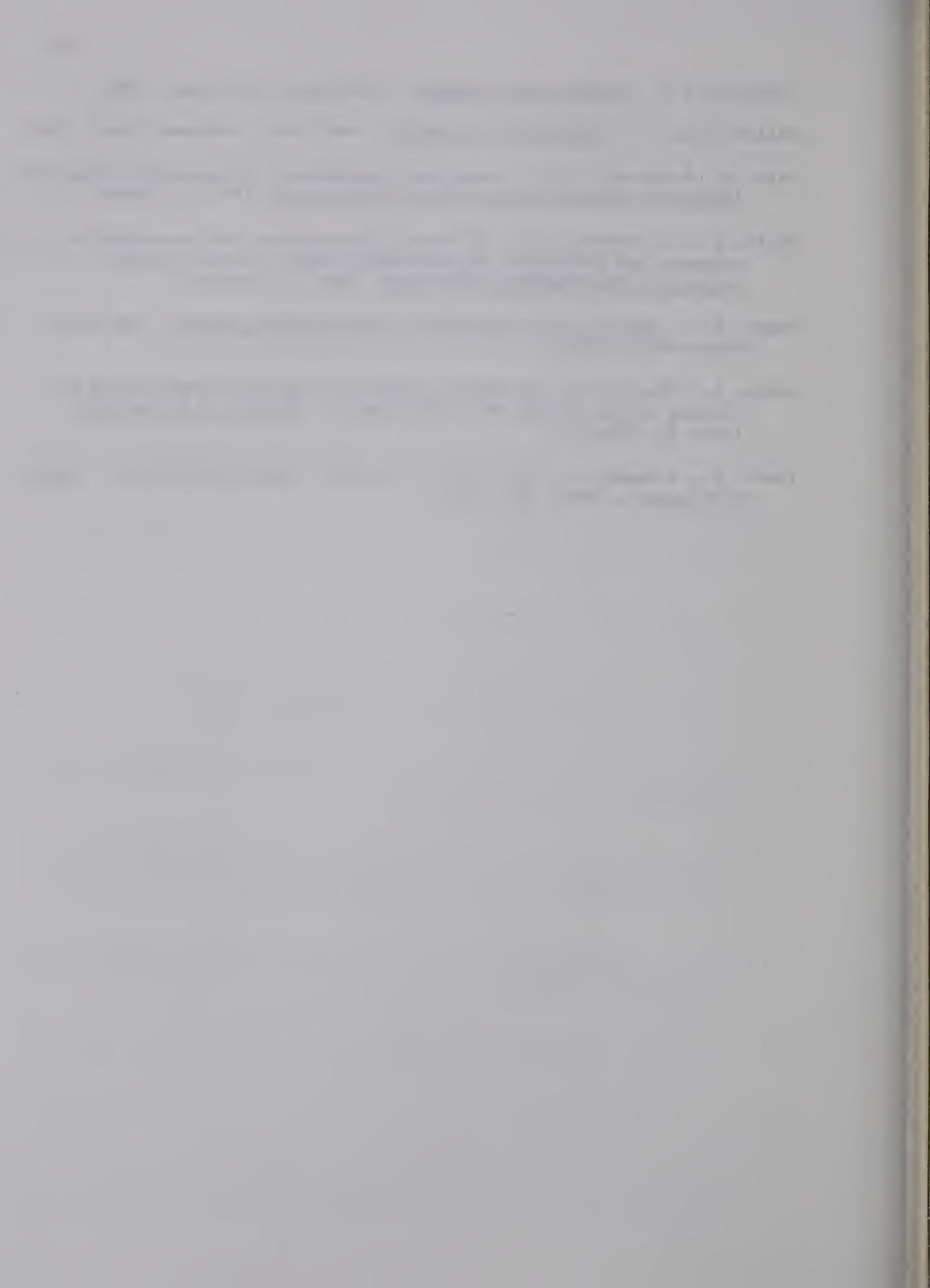
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## APPENDIX A



INTERPERSONAL-TOPICAL INVENTORY

## INSTRUCTIONS

You will be given some situations and topics to which we would like you to respond. The responses are given in pairs. You are to choose one response from each pair. Choose the response that most closely fits your opinion or feeling and indicate your choice by circling the letter "A" or "B" corresponding to the response chosen. Always choose one member of each pair. Never choose both members of the pair and do not skip over any of the pairs. If you agree with both, choose the one you agree with most strongly. If you do not agree with either, choose the one you find the least disagreeable of the two.

## Example:

Here is an example of the way the questions will be asked and the way they should be answered. The manner in which you will indicate your choice between the two given responses is illustrated below:

When I am confused . . .

---

Pair No.

(i)

(A)

I try to find a solution  
and end the confusion

B

I completely ignore the fact  
that I am confused.

---

OVER



## Pair No.

(ii)

A  
I break out into a nervous sweat.  
  
(B)  
I remain calm at all times

How to respond:

First: Decide which response you agree with most.

Second: Indicate which response you agree with most by circling the identifying letter. Thus, if in comparing the first pair of statements, you agree with the statement, "I try to find a solution and end the confusion," more than with the statement, "I completely ignore the fact that I am confused," you would circle letter "A" (above the chosen statement). Having chosen one (never both, never neither) statement from the first pair of statements, you would then move on to the second pair. If, in considering the second pair, you find that you agree more with the statement, "I remain calm at all times," (as compared to the statement, "I break out into a nervous sweat"), you would circle the letter "B".

On the pages that follow there are 36 different pairs of responses. There are six pairs to one page. You are to select one response from each pair, the one that more accurately shows your opinion or feeling and record your choice by circling the letter indicating the statement chosen. Be frank and indicate, in each case, your true feeling or opinion or the reaction which you actually would make in the situation. Do not indicate how you should feel or act; rather,

OVER



indicate how you do feel and act.

Make sure that you are aware of the situation or topic that each pair of responses refers to. You will find the situation or topic identified at the top of each page. All items on the page refer to the situation or topic appearing at the top of that page.

When you are finished, your paper should contain 36 circles. Check back and make sure that you have made 36 choices, no more no less.

Remember: (1) Respond only once for each pair; that is, choose one member of the pair, never both, never neither. Indicate your choice by circling either "A" or "B".

(2) When you are finished you should have made 36 circles.

Work at your own rate of speed but work straight through the inventory without stopping. Once you have completed a page do not return to it.

YOU MAY BEGIN



1. Imagine that someone has criticized you. Choose the response from each pair that comes closest to your feelings about such criticism. Indicate your choice by circling either "A" or "B".

When I am criticized . . .

Pair No.

(1)

A

I try to take the criticism, think about it, and value it for what it is worth. Unjustified criticism is as helpful as justified criticism in discovering what other people's standards are.

B

I try to accept the criticism but often find that it is not justified. People are too quick to criticize something because it doesn't fit their standards.

(2)

A

I try to determine whether I was right or wrong. I examine my behaviour to see if it was abnormal. Criticism usually indicates that I have acted badly and tends to make me aware of my own bad points.

B

It could possibly be that there is some misunderstanding about something I did or said. After we both explain our viewpoints, we can probably reach some sort of compromise.

(3)

A

I listen to what the person says and try to accept it. At any rate, I will compare it to my own way of thinking and try to understand what it means.

B

I feel that either I'm not right, or the person who is criticizing me is not right. I have a talk with the person to see what's right or wrong.

(4)

A

I usually do not take it with good humor. Although, at times, constructive criticism is very good, I don't always think that the criticizer knows what he is talking about.

B

At first I feel that it is unfair and that I know what I am doing, but later I realize that the person criticizing me was right and I am thankful for his advice. I realize that he is just trying to better my actions.

TURN THE PAGE OVER.



(5)

A

I try to ask myself what advantages this viewpoint has over mine. Sometimes both views have their advantages and it is better to combine them. Criticism usually helps me to learn better ways of dealing with others.

B

I am very thankful. Often I can't see my own errors because I am too engrossed in my own work at the time. An outsider can judge and help me correct the errors. Criticism in everyday life usually hurts my feelings, but I know it is for my own good.

(6)

A

It often has little or no effect on me. I don't mind constructive criticism too much, but I dislike destructive criticism. Destructive criticism should be ignored.

B

I try to accept and consider the criticism. Sometimes it has caused me to change myself; at other times I have felt that the criticism didn't really make much sense.

2. Imagine that you are in doubt. Choose the response from each pair that comes closest to your feelings about such doubt. Indicate your choice by circling either "A" or "B".

When I am in doubt . . .

Pair No.

(7)

A

I become uncomfortable. Doubt can cause confusion and make one do a poor job. When one is in doubt he should ask and be sure of himself.

B

I find myself wanting to remove the doubt, but this often takes time. I may ask for help or advice if I feel that my questions won't bother the other person.

(8)

A

I don't get too upset about it. I don't like to ask someone else unless I have to. It's better to discover the correct answer on your own.

B

I usually go to someone who knows the correct answer to my question. Sometimes I go to a book which will set me straight by removing the doubt.



(9)

A

I first try to reason things out and check over the facts. Often I approach others to get ideas that will provide a solution.

B

I think things over, ask questions, and see what I can come up with. Often several answers are reasonable and it may be difficult to settle on one.

(10)

A

I realize that I'll have to decide on the correct answer on my own. Others try to be helpful, but often do not give me the right advice. I like to judge for myself.

B

I usually try to find out what others think, especially my friends. They may not know the answer, but they often give some good ideas.

(11)

A

I look over the problem and try to see why there is a doubt. I try to figure things out. Sometimes I just have to wait awhile for an answer to come to me.

B

I try to get some definite information as soon as possible. Doubt can be bad if it lasts too long. It's better to be sure of yourself.

(12)

A

I consider what is best in the given situation. Although one should not rush himself when in doubt, he should certainly try to discover the right answer.

B

I act according to the situation. Sometimes doubt can be more serious than at other times and many of our serious doubts must go unanswered.

3. Imagine that a friend has acted differently toward you. Choose the response from each pair that comes closest to your feelings about such an action. Indicate your choice by circling either "A" or "B".

When a friend acts differently toward me . . .  
Pair No.

TURN THE PAGE OVER.



(13)

A

I am not terribly surprised because people can act in many different ways. We are different people and I can't expect to understand all his reasons for acting in different ways.

B

I am usually somewhat surprised but it doesn't bother me very much. I usually act the way I feel towards others. People worry too mucy about others' actions and reactions.

(14)

A

I find out why. If I have done somethine wrong I will try to straighten out the situation. If I think he's wrong, I expect him to clear things up.

B

I feel that I may have caused him to act in a different way. Of course, he may have other reasons for acting differently which would come out in time.

(15)

A

I first wonder what the trouble is. I try to look at it from his viewpoint and see if I might be doing something to make him act differently toward me.

B

It is probably because he has had a bad day, which would explain this different behaviour; in other cases he may just be a changeable kind of person.

(16)

A

It is probably just because something is bothering him. I might try to cheer him up or to help him out. If these things didn't work I would just wait for him to get over it.

B

I try to understand what his different actions mean. I can learn more about my friend if I try to figure out why he does things. Sometimes the reasons may not be very clear.

(17)

A

There has to be a definite reason. I try to find out this reason, and then act accordingly. If I'm right I'll let him know it. If he's wrong, he should apologize.

B

I usually let him go his way and I go mine. If a friend wants to act differently that's his business, but it's my business if I don't want to be around when he's that way.

(18)

A

I don't get excited. People change and this may cause differences. It is important to have friends, but you can't expect them to always be the same.

B

I like to get things back to normal as soon as possible. It isn't right for friends to have differences between them. Whoever is at fault should straighten himself out.



4. Think about the topic of people in general. Choose the response for each pair that comes closest to your thoughts about people. Indicate your choice by circling either "A" or "B".

This I believe about people . . .

Pair No.

---

(19)

A

Whatever differences may exist between persons, they can usually get along if they really want to. Although their ideas may not agree, they probably still have something in common.

B

People can learn from those who have different ideas. Other people usually have some information or have had some experience which is interesting and can add to one's knowledge.

---

(20)

A

People can act in all sorts of ways. No single way is always best, although at certain times a particular action might be wiser than others.

B

Each person should be able to decide the correct thing for himself. There are always a few choices to be made and the individual himself is in the best position to pick the right one.

---

(21)

A

Some people think they know what's best for others and try to give advice. These people shouldn't make suggestions unless asked for help.

B

There are certain definite ways in which people should act. Some don't know what the standards are and therefore need to be straightened out.

---

(22)

A

I can tell if I am going to get along with a person very soon after meeting him. Most people act either one way or another and usually it is not difficult to say what they are like.

B

It's hard for me to say what a person is like until I've known him a long time. People are not easy to understand and often act in unpredictable ways.

---

TURN THE PAGE OVER.



(23)

A

People have an outside appearance that usually isn't anything like what can be found on the inside, if you search long and hard enough.

B

Each person is an individual. Although some people have more good or bad points than others, no one has the right to change them.

(24)

A

People can be put into categories on the basis of what they're really like. Knowing the way a person really is helps you to get along with him better.

B

People are unlike one another in many respects. You can get along with people better and better understand them if you are aware of the differences.

5. Think about the general topic of leaders. Choose the response from each pair that comes closest to your thoughts about leaders. Indicate your choice by circling either "A" or "B".

Leaders . . .

Pair No. \_\_\_\_\_

(25)

A

Leaders do not always make the right decisions. In such cases, it is wise for a man to look out for his own welfare.

B

Leaders are necessary in all cases. If a leader cannot make the right decisions another should be found who can.

(26)

A

Leaders cannot provide all the answers. They are like other people -- they have to try to figure out what action is necessary and learn from their mistakes.

B

Leaders make decisions sometimes without being sure of themselves. We should try to understand this and think of ways to help them out.

(27)

A

I like a leader who is aware of how the group feels about things. Such a leader would not lead any two groups in exactly the same way.

B

A person should be able to put his confidence in a leader and feel that the leader can make the right decision in a difficult situation.



(28)

A

There are times when a leader shouldn't make decisions for those under him. The leader has the power to decide things, but each man has certain rights also.

B

A leader should give those under him some opportunity to make decisions, when possible. At times, the leader is not the best judge of a situation and should be willing to accept what others have to say.

(29)

A

Some leaders are good, others are quite poor. Good leaders are those who know what is right for the man under them. These leaders deserve the respect of every man.

B

Leaders cannot be judged easily. Many things go to make up good leadership. Most people fall short in some way or another, but that is to be expected.

(30)

A

Leaders are needed more at certain times than at others. Even though people can work out many of their own problems, a leader can sometimes give valuable advice.

B

Some people need leaders to make their decisions. I prefer to be an individual and decide for myself, when possible. Most leaders won't let you do this.

6. Imagine that someone has found fault with you. Choose the response from each pair that comes closest to your feelings about such a situation. Indicate your choice by circling either "A" or "B".

When other people find fault with me . . .

Pair No. \_\_\_\_\_

(31)

A

It means that someone dislikes something I'm doing. People who find fault with others are not always correct. Each person has his own ideas about what's right.

B

It means that someone has noticed something and feels he must speak out. It may be that we don't agree about a certain thing. Although we both have our own ideas, we can talk about it.

TURN THE PAGE OVER.



(32)

A

I wonder if they are serious and why they have found fault with me. I then try to consider what they've said and make changes if it will help.

B

If enough people point out the same fault, there must be something to it. I try to rid myself of the fault, especially if the critics are people "in the know".

(33)

A

They have noticed something about me of which I am not aware. Although criticism may be hard to take, it is often helpful.

B

They are telling me something they feel is correct. Often they may have a good point which can help me in my own thinking. At least it's worthwhile to consider it.

(34)

A

I may accept what is said or I may not. It depends upon who is pointing out the fault. Sometimes it's best to stay out of sight.

B

I accept what is said if it is worthwhile, but sometimes I don't feel like changing anything. I usually question the person.

(35)

A

I like to find out what it means; since people are different from one another, it could mean almost anything. A few people just like to find fault with others but there's usually something to be learned.

B

There is something to be changed. Either I am doing something wrong or else they don't like what I'm doing. Whoever is at fault should be informed so that the situation can be set straight.

(36)

A

I don't mind if their remarks are meant to be helpful, but there are too many people who find fault just to give you a hard time.

B

It often means that they're trying to be disagreeable. People get this way when they've had a bad day. I try to examine their remarks in terms of what's behind them.

CHECK AND MAKE SURE THAT YOU'VE CHOSEN ONE MEMBER OF EACH PAIR  
(A TOTAL OF 36 CIRCLES)



## ITI SCORING KEY

SYSTEM		SYSTEM	
<u>Pair No.</u>	<u>A</u>	<u>B</u>	<u>Pair No.</u>
1.	3	2	19.
2.	1	4	20.
3.	3	1	21.
4.	2	1	22.
5.	4	3	23.
6.	2	4	24.
7.	1	3	25.
8.	2	1	26.
9.	3	4	27.
10.	2	3	28.
11.	4	1	29.
12.	2	4	30.
13.	4	2	31.
14.	1	3	32.
15.	3	2	33.
16.	3	4	34.
17.	1	2	35.
18.	4	1	36.



## CLASSIFICATION NORMS FOR THE ITI

I. Norms based on 461 Naval enlistees (medium age 18; intelligence from the upper half of the distribution for this group)

<u>decile</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10	13-16	12-16	12-16	13-16
9	12	11	11	12
8	11	10	10	11
7	10-11	9	9-10	10-11

II. Norms based on 90 Rutgers College freshmen

<u>decile</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
10	12-16	12-16	12	14-16
9	11-12	11	11	13
8	9-10	10	10	12
7	9	9	10	12

Classify S into that system in which he scores in the 8th, 9th, or 10th decile provided he scores in a lower decile in the other three systems. Ss scoring equally high in more than one system cannot be classified.

E.G. (using College norms)

13	6	11	6	Classify as System I
7	11	10	8	Classify as System II
8	9	10	9	Classify as System III
6	6	11	13	Cannot be classified



## **APPENDIX B**



## PARAGRAPH COMPLETION TEST

Complete the following words or phrases in two or three sentences -- or more if you feel this is necessary.

1. "Rules . . . "

2. "When I am in doubt . . . "

3. "Confusion . . . "

4. "Parents . . . "

5. "When I am criticized . . . "

6. "When others criticize me it usually means . . . "



## SAMPLE RESPONSES

## Reference: Rules

## Integration Index

Scale Point	Responses
1	<p>(a) "are made to be followed. They give direction to a project or life or anything. They should not be broken except in extreme circumstances."</p> <p>(b) "are made to govern society and to keep society from living in chaos. We also have enforcement agencies to make sure people follow rules. If they don't, punishment follows."</p> <p>(c) "are absolutely ridiculous. Rules are restraining the human being who should be free and thinking for himself. Persons who make rules want to be masters and make others followers. I like to break every rule I can as long as there is no danger of getting caught."</p>
3	<p>(a) "People seem to forget that rules are not ends in themselves. They were made by us, not created by their own will, for our benefit. People, for the most part, often don't see beyond the point of the rules, don't look for the underlying reasons."</p> <p>(b) "are usually made with the intention of doing someone or society some good. Often, over time, they become distorted and meaningless and too few people are helped by them. Then, if it cannot easily be enforced, it is virtually disregarded."</p>
5	<p>(a) "must be inspected before they are obeyed blindly. Obeying a 'bad' rule or law is perhaps worse than not obeying. If one obeys he gives it strength. Rules should be examined by society and changed, if necessary, by the process of law or obsolescence or enough people refusing to obey them publicly."</p> <p>(b) "are necessary for a society to function well. However, rules should not be so strictly adhered to that they cannot be modified when circumstances alter. The purpose or effects of rules are more important than the rules themselves."</p>



Scale Point	Responses
7	<p>(a) "serve mankind and should be interpreted in terms of their ends, not their letter. They have a purpose both for the governed (keeping order) and for those who govern (order, maintaining status quo, etc.), which purpose can and perhaps should, change from time and place and, hopefully, lead to a better, broader basis of understanding humans and making rules."</p> <p>(b) "are made for everyone but are interpreted in many ways. It depends on the point of view of the interpreter. It is in this very process of interpretation that a society stays dynamic and changes and grows." (Schroder et. al., 1967, pp. 190-192.)</p>



## APPENDIX C



## THE THIS I BELIEVE (TIB) TEST

The instrument aims at providing a basis of dimensionalizing an individual's more central concepts or beliefs according to the criteria implicit in the characterization of the four systems. Thus the sentences to be completed have to do with significant personal and social referents. Subjects are asked to indicate their beliefs about these referents by completing in two or three sentences the phrase; "This I believe about \_\_\_\_\_," the blank being replaced successively by one of the following referents: friendship, the American way of life, guilt, marriage, myself, religion, sin, majority opinion, people, compromise, the future, and the past. As can be seen, some of these referents are relevant mainly to one system whereas the relevance of others is more general.

As detailed in earlier publications (Harvey, 1964; 1965; 1966; Ware and Harvey, 1966; White and Harvey, 1965), the completions are scored both in terms of their positive and their negative orientations toward the referents and their absolutism, evaluativeness, multiplicity of alternatives, triteness, and normativeness. In the more than 30 studies in which it has been used at the University of Colorado and other universities, the TIB has been found to predict accurately and reliably to a wide range of both paper and pencil tests and experimentally induced behaviour (Coates, 1968, pp. 80-82).



## SAMPLE RESPONSES

Referent: Friendship

## SYSTEM 1

## SYSTEM 2

Friendship can be very important part of life. A person always needs someone to confide his secrets and trouble to. This allows a source of outlet.

... is a wonderful thing. Is a necessary thing.

True friendship is hard to find. Should be preserved at all costs (almost?).

... is a two way relationship: one must be a friend to someone, in addition to having friends.

... is one of the most important things to have in life: to have someone to confide in and express one's hopes and dreams, troubles and fears.

You can trust your friends and confide in them when you are upset knowing they will keep it between you and them.

To be true and faithful to a friend is one of the most rewarding things in life, for it allows one to be unselfish and thoughtful.

The most priceless gift in the world.

... is a valuable gift and should never be taken lightly.

It is very important to have one or more real good friends. Most people are just acquaintances.

That a man needs it but that it should be extended with caution and restricted to a few persons of one's own choosing.

That one is an ass to try to be a "friend to man" -- he will only reject you.

It's fine if you have genuine sincere friends, who have proven themselves to be so. Otherwise having friends is worse than being a hermit.

Very few are really sincere. Each individual is always seeking something from the other even if he won't admit it to himself.

I don't think people can exist without them, but friends are not always lasting.

It's impossible to find anyone you can really trust.



## SAMPLE RESPONSES

Referent: Friendship

---

SYSTEM 1SYSTEM 2

---

A must for the human creature -- I  
need people to relate to -- very  
close personal relationships,  
people I can respect, confide in  
and trust other than my family.

Preferably someone I see often and  
have very similar interests or common  
experiences.



## SAMPLE RESPONSES

Referent: Friendship

SYSTEM 3	SYSTEM 4
Without friends life would be meaningless.	... is the best thing this earthly life has to offer. Anything further said would detract from this.
Friends are more important to me than anything else.	... is more important than factual knowledge.
... is a grand and wonderful thing.	... can be very beautiful.
... is very important in our society.	... exists on many levels.
An element essential in normal human relationships.	... is loyalty, compassion, candor to the person one claims as a friend; all mankind should be so treated, but one's friends are treated in this fashion with particular affection and attention.
Most people that one can talk with and get to know become one's friends.	Friendship is often an excuse for use, but may be an altruistic concern for others. The word means only what the situation means.
One of the most desirable attributes.	
Is extremely necessary and good for a person to have many good friends.	
Friends can make life much fuller and much more interesting.	
Friends are essential to a well-rounded person.	
The best thing in the world -- absolutely necessary for people to have it.	



## SAMPLE RESPONSES

Referent: Religion

SYSTEM 1	SYSTEM 2
Dependence on God is the answer to the world's ills.	... abolishes people's progress.
Religion is serving to be a moral stabilizer for many people. It has also been commercialized to become a big business.	... only helps people who need a crutch.
... is a necessary thing. I believe in it. It should be stressed more.	... is a farce.
... is good, can aid our country, ourselves, and our friends.	That its leaders are parasites.
... is a communion between oneself and God.	The whole mess is a gigantic hoax. However, I have nothing against religious people as long as they're sincere about their beliefs. I hate hypocrites. I myself am an atheist.
... is a personal relationship and if one lives religiously -- morally and righteously. In fact, today it may be almost meaningless.	I despise it.
... is the most important thing in the world. I believe in God, trust in Him, and want to do my very best to please Him, by attending church, praying and being good.	... is archaic in doctrine and practice, and therefore of relatively small use to modern man.
It should enter into every act of every day: It is the basis for all my beliefs.	Religions do not allow one to express himself, but rather demand a strict orthodoxy based on some dogma.
If you have true faith in God, you will have no problems about religion.	Gives people a false sense of security, and keeps them from seeing the absurdity of life.
It is absolutely necessary for everyone to have a religion.	... doesn't interest me much.
There is life after death.	I have no need for it.
There is a supreme being -- a God.	... is worthless, intolerant, arrogant, and self-centered.
Strength of character can only be possessed thru a strong conviction with some religion.	Hogwash, a trick played by spooks in black robes.



## SAMPLE RESPONSES

Referent: Religion

---

SYSTEM 1

---

SYSTEM 2

---

There is no such animal as an  
"Atheist." Perhaps as a fad,  
but at the moment of truth  
"No".



## SAMPLE RESPONSES

Referent: Religion

## SYSTEM 3

## SYSTEM 4

It is a necessary thing -- but I don't believe in it.

An important facet in the lives of most people.

Takes many forms and the individual usually chooses or inherits the one most pertinent to his particular case.

A very personal subject, which is of varying degrees of importance to persons.

A person should ponder his beliefs and understand them, rather than simply living by some standards which he has been taught.

I don't believe it is an absolute because then I feel I would be closing my mind and I don't like closed minds.

A beautiful and interesting tradition.

... is necessary and good for people but I don't think everyone must believe in God.

It is great; it is necessary for people so that they can lead happy secure lives and get along with each other.

... is necessary for majority of human beings but should not be forced on all -- I'm talking about institutionalized religion.

Has always served a purpose for man.

Can inspire truly ethical action.

Much theology is utilitarian.

... often inspires intolerance.

It is without walls, only paths leading to it.

Using it for a form of social display, i.e. Christmas and Easter attendance only, is the worst of all hypocrisies. To doubt is to have more religion than the above behaviour.

It is a person's way of life. It may be a belief in God, in heaven and the afterlife; or a reconciling of the unknown and unseen with the concrete; or a simple philosophy one believes with all his heart and lives by; or it may be life -- his God, himself. This latter one is my religion, and I live it fully.

Religion may be the essential life. No God may exist; yet things are generally better for the belief in one. The commitment to certain forms of behaviour is to the advantage of the society and the individual



## APPENDIX D



## GROUPS OF NATIONS

Here are twenty nations in alphabetical order:

Canada  
China (Formosa)  
China (mainland)  
Czechoslovakia  
Egypt  
France  
Germany (East)  
Germany (West)  
Great Britain  
India  
Israel  
Italy  
Japan  
Mexico  
Pakistan  
Poland  
Union of South Africa  
USSR (Russia)  
United States of America  
Yugoslavia

When you think of the various nations in the world, some of them seem to be more closely related than others. You can make up groups of nations that share common qualities quite distinct from others.

On the following pages there are spaces. In each space write the names of several countries which can be grouped together. At the bottom of the space, opposite QUALITY, write the quality the nations in that group have in common. Choose the countries from those listed above.

Put each country in as many groups as you like, but be sure to write down what each group has in common.

If you need extra paper, ask for it. Have you any questions?



Space 1

Space 2

QUALITY

QUALITY

Space 3

Space 4

QUALITY

QUALITY



## THE GROUPS OF NATIONS TEST

Detailed Scoring Key (Gardiner, 1968, pp. 111-113)

- I. The subject's total score on the test is the sum of the number-of-groups score and the qualitative-concepts score.
  
- II. The Number-of-Groups Score.

Assign the subject a score of 1 for each valid and distinct grouping he produces. If the groupings overlap, assign them a score of 1. Such a grouping follows:

Nations:

Canada

United States  
of America

Quality:

North-American Nations

Nations:

Canada

Mexico

Quality:

North-American Nations

These two groupings would be assigned a collective score of 1.

Do not assign a score to groupings which are superficial or supercilious. Groupings such as the following are not valid:

Nations:

Canada

China (mainland)

Czechoslovakia

Quality:

All begin with the letter "c".

- III. The Qualitative-Concepts Score.

A. Geographical Concepts. Give the subject a score of 1 if he produces one or more groupings using simple geographical concepts. Give him an additional score of 2 if he produces one or more groupings which utilize unusual or original but valid geographical concepts. (Originality may be regarded as statistical uncommonness of responses (Maltzman, 1960; Anderson, 1966), but the validity of an original grouping must be subjectively evaluated by the scorer.)

B. Political, Economic and Cultural Concepts. Give the subject a score of 2 if he produces one or more groupings using political concepts. Valid economic or cultural concepts shall also be assigned a score of 2. If the subject uses an original, meritorious concept falling into any one of these three categories, he shall be assigned an additional score of 3 for that category.

C. Unusual Concepts Falling into Other Categories. Give the subject a score of 3 if he produces a grouping using an original, meritorious concept which does not fall into any of



the previously described categories.

D. Please note that when qualitative-concept points have been awarded for a certain category (e.g., geography), no further points are to be assigned to that category. For example, if the subject produces ten groupings using ten simple geographical concepts, his qualitative-concepts score would be 1.

#### IV. Some Examples of Commonly-Used Concepts.

##### A. Geographical Concepts (Score = 1)

###### Nations:

Great Britain

France

Poland

Yugoslavia

###### Quality:

European Nations

###### Nations:

Canada

Mexico

Japan

###### Quality:

Mountainous Nations

##### B. Political Concepts (Score = 2)

###### Nations:

Canada

Great Britain

France

United States  
of America

###### Quality:

Democracies

###### Nations:

USSR (Russia)

Yugoslavia

Poland

Germany (East)

###### Quality:

Communist Governments

##### C. Economic Concepts (Score = 2)

###### Nations:

Great Britain

Japan

Czechoslovakia

United States  
of America

###### Quality:

Industrialized Nations

###### Nations:

Canada

United States

of America

Israel

Union of South Africa

###### Quality:

Market Economies

##### D. Social Concepts (Score = 2)

###### Nations:

Union of South Africa

United States of America

Great Britain

###### Quality:

Racial Unrest

###### Nations:

Canada

Czechoslovakia

USSR (Russia)

###### Quality:

World Ice-Hockey Powers



## APPENDIX E



## INFERENCE TEST

In each item on this test you will be given one or two statements such as you might see in newspapers or popular magazines. The statements are followed by various conclusions which some people might draw from them. In each case, decide which conclusion can be drawn from the statement(s) without assuming anything in addition to the information given in the statement(s). There is only one correct conclusion.

Mark your answer by putting an X through the number in front of the conclusion that you select.

Consider the following sample item:

Bill, a member of the basketball team, is 6 feet, 2 inches tall and weighs 195 pounds. To qualify for the team, a person must be at least 5 feet, 10 inches tall.

- 1 - The larger a man is, the better basketball player he is.
- 2 - Basketball players are often underweight.
- 3 - Some players on the team are more than 6 feet tall.
- 4 - Bill is larger than the average man.
- 5 - The best basketball players come from the ranks of larger-than-average men.

Only conclusion 3 may be drawn without assuming that you have information or knowledge beyond what the statements give. The statements say nothing about how good different players are, nothing about whether they are underweight, and nothing about average or taller than average men.

You will have 6 minutes for each of the two parts of this test. Each part has three pages. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.



Part 1 (6 minutes)

1. More fatal accidents occur on highways after dark than during daylight hours.
  - 1 - Darkness causes accidents.
  - 2 - A decrease in the volume of traffic tends to increase fatal accidents.
  - 3 - The chance of being killed in an automobile accident is lower during the day than it is at night.
  - 4 - There are more fatal accidents after dark since drivers tend to be more tired.
  - 5 - After dark, drivers frequently have accidents when they are blinded by the lights of oncoming cars.
2. One year a particular farmer's stand of wheat yielded 40 bushels per acre.
  - 1 - The farmer's land is extremely fertile.
  - 2 - The farmer has raised wheat on his land.
  - 3 - The weather that year was unfavourable for growing wheat.
  - 4 - Forty bushels per acre is a high yield.
  - 5 - The field would be more suitable for some other crop.
3. The Pacific sea otter has the most beautiful and valuable fur in the world. Between 1725 and 1910 the otter was exploited commercially. In order to protect the otter from extinction, a 1910 international treaty outlawed otter hunting.
  - 1 - Many people were greedy for the fur, and they competed bitterly for it.
  - 2 - Today, no amount of money can purchase a coat of this valuable fur.
  - 3 - The sea otters were pushed so close to extinction that even today any major disease or serious poaching could wipe them out.
  - 4 - By the beginning of this century, the sea otter's valuable fur had endangered its survival.
  - 5 - Between 1725 and 1910 more sea otters were caught than any other fur-bearing animal.
4. Recently, it has been discovered that it is possible to rid an area of starlings if a recording of a starling in distress is played over loud-speakers for several evenings.
  - 1 - One starling control technique used recordings of starlings in distress.
  - 2 - When starlings hear the distress calls of other starlings, they flee.
  - 3 - Starlings have been multiplying and spreading at an appalling rate.
  - 4 - The starling control problem could be solved if such recordings were used in enough places.
  - 5 - The best way to control starlings is to frighten them.

GO ON TO THE NEXT PAGE.



Part 1 (Continued)

5. The combined presence of carbon, water, and temperatures at which water is ordinarily a liquid are essential to life on earth.
- 1 - Life on the moon seems impossible since the moon has no water.
  - 2 - The only possible components of living things are the elements known to us.
  - 3 - All living things on earth use carbon.
  - 4 - The conditions given in the statement are the only ones that are essential to life on earth.
  - 5 - Living things are resistant to large temperature changes.
6. On the average, U.S. citizens are taller today than they were 100 years ago.
- 1 - Large numbers of tall people have immigrated over the past 100 years.
  - 2 - The taller men have tended to marry the taller women.
  - 3 - Tall parents have taller children than short parents have.
  - 4 - People's diets are better today.
  - 5 - John is probably taller than his grandfather.
7. Life expectancy tables show that one out of each 100 people in the U.S. will live to be more than 95 years old and 54 will live to be at least 68.
- 1 - Less than half of the U.S. population is expected to die before the age of 68.
  - 2 - Women have a greater life expectancy than men.
  - 3 - Most men who live to be 68 will live to be 95.
  - 4 - Living to be very old is the result of having a long life expectancy.
  - 5 - The average man will not live to be 68.
8. Excavations at the ruins of the ancient temple called Stonehenge indicate the temple was built upon a site previously used by two other primitive civilizations. It has been estimated that the temple was constructed between 1500 and 1400 B.C.
- 1 - The two earlier civilizations used this temple as a common meeting place.
  - 2 - Two earlier temples had been erected on the site.
  - 3 - The first of the primitive civilizations used this site before 1400 B.C.
  - 4 - Stonehenge was built by a primitive civilization known as the Druids.
  - 5 - Parts of three temples previously on the site have been excavated.

GO ON TO THE NEXT PAGE.



Part 1 (Continued)

9. The salt deposits at Natrium, which are at a depth of 6,800 feet, are in the same stratum that runs under Cleveland at a depth of 1,000 feet. This stratum gradually deepens in a southeasterly direction from Cleveland.
- 1 - Cleveland lies to the northwest of Natrium.  
2 - One of the strata that run beneath both Natrium and Cleveland has salt deposits in it.  
3 - Strata which have salt deposits are usually at a depth of at least 1,000 feet.  
4 - There are salt deposits from Cleveland to Natrium.  
5 - The altitude of Cleveland is probably greater than that of Natrium.
10. Most students who cheat on exams are caught.
- 1 - School authorities deal effectively with cheaters.  
2 - Most students who cheat on exams are punished.  
3 - Cheaters deserve to be punished.  
4 - Cheaters are always found out.  
5 - Some cheaters are never discovered.

DO NOT GO ON TO THE NEXT PAGE UNTIL ASKED TO DO SO.



Part 2 (6 minutes)

11. Today it generally costs more to build a house than it cost to build one 20 years ago.
- 1 - Building costs have risen during the past 20 years.
  - 2 - Most houses that people are building today are larger than the ones built 20 years ago.
  - 3 - Builders are using more expensive materials today.
  - 4 - People are equipping new houses with more expensive appliances.
  - 5 - The cost of living has risen over the past 20 years.
12. A few small mammals can hear frequencies up to and above 30,000 cycles per second.
- 1 - Most animals can hear frequencies which are as high as 30,000 cycles per second.
  - 2 - Bats are not very sensitive to low frequencies.
  - 3 - The smaller the animal, the higher the frequencies that it can hear.
  - 4 - Only the bat can hear frequencies above 30,000 cycles per second.
  - 5 - A bat's ears are more sensitive to high frequencies than are the ears of most small mammals.
13. All human beings fall into four main groups according to the composition of their blood: O, A, B, and AB. Knowledge of these blood types is important for transfusions.
- 1 - The blood type is determined by genes.
  - 2 - Persons of group AB can receive blood from any other type.
  - 3 - Blood transfusions between members of the same group are always safe.
  - 4 - Certain percentages of all people belong to each type.
  - 5 - Blood from persons of group O can safely be given to persons of any group.
14. The painted vases, friezes, and other remains, which have been found in the ruins of the Minoan civilization of ancient Crete, give the impression of a gay, aristocratic culture.
- 1 - Artistic achievement is the true measure of cultural development.
  - 2 - Something can be learned about a society from its works of art.
  - 3 - Written records are the most valuable source of human knowledge.
  - 4 - The Minoans did not know the art of writing.
  - 5 - An aristocratic culture is not likely to be concerned with transmitting its culture to future generations.

GO ON TO THE NEXT PAGE.



Part 2 (Continued)

15. A car, driven by a man who had been drinking, was involved in a wreck with a speeding truck.
- 1 - The wreck probably could have been avoided if the man had not been drinking.
  - 2 - The cause of the wreck might have been liquor or speed.
  - 3 - The car was probably travelling too fast as well.
  - 4 - Accidents are caused by reckless driving.
  - 5 - Trucks should not travel so fast.
16. A squid travels by jet propulsion. It takes in water by opening the muscular mantle which surrounds its body. Then the squid moves by squirting the water out through a powerful siphon.
- 1 - The squid's jet propulsion enables it to overtake nearly anything that swims.
  - 2 - The squid's mantle has ten muscular tentacles.
  - 3 - The stream of water provides the thrust which moves the squid.
  - 4 - The squid is propelled backward through the water.
  - 5 - Most squid are active, highly mobile animals of aggressive habits.
17. The world's population is increasing at a tremendous rate but the supply of water is remaining constant.
- 1 - The world is becoming more crowded.
  - 2 - The standard of living will decline in the future.
  - 3 - In the future, few people will have enough to drink.
  - 4 - In the future, it will be necessary to use less water for washing.
  - 5 - The population is becoming denser where there is a good supply of water.
18. Skin darkness and colour depend on the concentration and colour of pigment particles in pigment-bearing cells.
- 1 - The number of pigment particles in a cell remains constant.
  - 2 - A tan results when new pigment particles are produced.
  - 3 - The cells with pigment are found in the deeper skin layers.
  - 4 - Pigment particles are not uniformly distributed in the body.
  - 5 - Some skin cells contain relatively few pigment particles.

GO ON TO THE NEXT PAGE.



Part 2 (Continued)

19. During the Italian Renaissance most naturalists were artists as well.
- 1 - Leonardo da Vinci, a Renaissance artist, made many scientific observations.
  - 2 - During the Renaissance there was a very close connection between the development of biological sciences and painting.
  - 3 - Renaissance artists and naturalists were trained both in analytic thought and realism.
  - 4 - Most artists of the Renaissance also became naturalists since it was too difficult to make a living through art alone.
  - 5 - The progress of natural science spurred Renaissance artists to increased activity so that the esthetic needs of society could be satisfied.
20. The wave lengths of light which are reflected from an object are what one sees and describes as the colour of the object. The other visible wave lengths are absorbed by the object.
- 1 - Black is the total absorption of all colours.
  - 2 - An infrared object reflects all wave lengths except the infrared wave lengths.
  - 3 - A "red" object reflects only the "red" wave lengths.
  - 4 - An object appears white when the wave lengths of the lightest colours are absorbed.
  - 5 - a "white" object reflects all colours.

DO NOT GO BACK TO PART 1 AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.



## INFERENCE TEST -- SCORING KEY

Part 1

Page 2

1-3, 2-2, 3-4, 4-1,

Page 3

5-3, 6-5, 7-1, 8-3

Page 4

9-2, 10-5

Part 2

Page 5

11-1, 12-5, 13-4, 14-2

Page 6

15-2, 16-3, 17-1, 18-5

Page 7

19-2, 20-3



## APPENDIX F



## GESTALT TRANSFORMATION

In each of the following items you will be presented with a problem which may be solved by using a part of one of the objects given as choices. The solution may be one requiring ingenuity. Place an X through the letter corresponding to the object which you think has a part which would best solve the problem.

For example:

To start a fire

- A - a fountain pen
- B - an onion
- C - a pocket watch
- D - a light bulb
- E - a bowling ball

The correct answer is "C" and an X has been marked on "C". This is correct because you could use the crystal from a pocket watch as a burning glass to start a fire.

The test consists of two parts. You will have 5 minutes working time for each part. Are there any questions?

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.



Part 1 (5 minutes)

1. To draw a perfect circle with a pencil      6. To tack a rug to a floor
- A - a spoon  
B - a plastic table cloth  
C - a sweater  
D - a spark plug  
E - a rubber boot
- A - a cup of coffee  
B - a golf club  
C - a pair of trousers  
D - a rifle bullet  
E - a pencil
2. To make a needle      7. To tie two things together
- A - a cabbage  
B - a splice  
C - a steak  
D - a paper box  
E - a fish
- A - a doughnut  
B - a catalogue  
C - a comb  
D - a bookshelf  
E - a piano
3. To stop severe bleeding      8. To repair a leak in an inner tube
- A - a razor blade  
B - a lima bean  
C - a light bulb  
D - a shoe  
E - a case of beer
- A - a pencil  
B - a magazine  
C - a fountain pen  
D - a carpet tack  
E - Scotch tape
4. To cut cheese      9. To lubricate a friction point
- A - a guitar  
B - a thermos bottle  
C - a hammer  
D - a pair of trousers  
E - a bed roll
- A - water  
B - a pencil  
C - a bottle of ink  
D - an eraser  
E - a dictionary
5. To remove old wallpaper from a wall      10. To sweep a floor
- A - a pillow  
B - putty  
C - a fire  
D - a chair  
E - a window
- A - a tree  
B - a 2-inch paint brush  
C - a sock  
D - a medicine cabinet  
E - a brief case

STOP HERE.. WAIT FOR FURTHER INSTRUCTIONS.



## Part 2 (5 minutes)

11. To use for dusting fingerprints      16. To get something out of reach
- A - a .45 cartridge  
 B - a cake soap  
 C - a light switch  
 D - a book  
 E - a cigarette
- A - an ashtray  
 B - a typewriter  
 C - a tree  
 D - a pencil sharpener  
 E - a thermos bottle
12. To use for tying a small package      17. To use as a hose
- A - a manhole cover  
 B - a pliers  
 C - a light bulb  
 D - a key  
 E - a match book
- A - a tree  
 B - a cigarette  
 C - a shirt  
 D - a bicycle  
 E - eyeglasses
13. To make eyes for a rag doll      18. To use as a funnel for filling a pill bottle
- A - a paper slip  
 B - a comb  
 C - a pair of glasses  
 D - a box of salt  
 E - a shirt
- A - a chair  
 B - a spoon  
 C - eyeglasses  
 D - a book  
 E - a glass tumbler
14. To fix a hydraulic brake system      19. To stuff a cushion
- A - a razor blade  
 B - a bottle of milk  
 C - an automobile tire  
 D - a sewing machine  
 E - a tennis racket
- A - pencils  
 B - people  
 C - rocks  
 D - cooked geese  
 E - golf balls
20. To make a swab      15. To keep people from slipping on an icy sidewalk
- A - a Sunday newspaper  
 B - a rope  
 C - a bottle of beer  
 D - a potted palm  
 E - a mirror
- A - cigarette lighter  
 B - a tree trunk  
 C - an inner tube  
 D - a hairpin  
 E - a lemon

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.



## GESTALT TRANSFORMATION -- SCORING KEY

Part 1

1 - C

2 - E

3 - D

4 - A

5 - E

6 - B

7 - E

8 - C

9 - B

10 - A

Part 2

11 - A

12 - C

13 - E

14 - B

15 - D

16 - C

17 - D

18 - D

19 - B

20 - A



## APPENDIX G



ASSOCIATIONS IV

The items in this test consist of pairs of words. Your task is to think of a word that is associated with both of the given words. The associated word must have a different meaning in its relation to each of the given words.

Look at the following example:

jewelry \_\_\_\_\_ ring \_\_\_\_\_ bell

The associated word "ring" has been written in the blank space between the given words. It has a different meaning in connection with each of the words. It is a piece of jewelry but it is also the sound of a bell.

Try the next example:

newstand \_\_\_\_\_ cannon

The associated word is "magazine" since it can be displayed at a newstand or it can be a storehouse for ammunition.

The remaining items should be worked in the same manner. Work rapidly, but be sure that your answer has TWO meanings.

This test consists of two parts, each containing 15 items. You will have 7 minutes working time for each part. Are there any questions?

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.



Part 1 (7 minutes)

- |     |             |       |             |
|-----|-------------|-------|-------------|
| 1.  | emerald     | _____ | rookie      |
| 2.  | theater     | _____ | fishing     |
| 3.  | card        | _____ | ship        |
| 4.  | clothes     | _____ | law         |
| 5.  | railroad    | _____ | electricity |
| 6.  | music       | _____ | tent        |
| 7.  | eye         | _____ | pig         |
| 8.  | postman     | _____ | knight      |
| 9.  | stove       | _____ | card game   |
| 10. | shepherd    | _____ | steal       |
| 11. | hibernation | _____ | porter      |
| 12. | river       | _____ | money       |
| 13. | duel        | _____ | time        |
| 14. | cigarette   | _____ | tree        |
| 15. | cheese      | _____ | pencil      |

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

STOP



Part 2 (7 minutes)

16. kitchen \_\_\_\_\_ boat
17. ink \_\_\_\_\_ animal
18. baseball \_\_\_\_\_ airplane
19. bird \_\_\_\_\_ dollar
20. radio \_\_\_\_\_ toothpaste
21. music \_\_\_\_\_ fish
22. girl \_\_\_\_\_ by-pass
23. hammer \_\_\_\_\_ finger
24. store \_\_\_\_\_ cavalry
25. wind \_\_\_\_\_ recruits
26. football \_\_\_\_\_ examination
27. fence \_\_\_\_\_ union
28. winter \_\_\_\_\_ pepper
29. candy \_\_\_\_\_ money
30. sum \_\_\_\_\_ nobility

DO NOT GO BACK TO PART 1 and

DO NOT GO TO ANY OTHER TEST UNTIL ASKED TO DO SO.

STOP



## ASSOCIATIONS IV -- SCORING KEY

There may be other words besides those listed in the key which can be considered correct. In order to be considered correct the response word must have a double meaning in its relation to each of the given words.

Part 1

1. green
2. cast, reel, lines
3. deck, bridge, queen
4. suit
5. conductor
6. pitch
7. sty
8. mail
9. poker
10. crook, fleece
11. sleeper, bear
12. bank
13. second
14. ash
15. sharp

Part 2

16. sink
17. pen
18. fly, liner
19. bill
20. tube
21. scale
22. skirt
23. nail
24. charge, general
25. draft, raw
26. pass
27. picket
28. season
29. mint
30. count



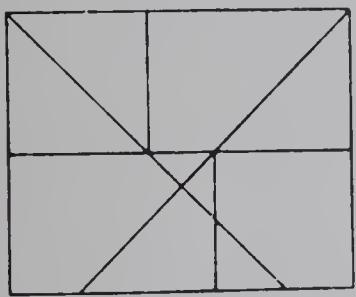
## APPENDIX H



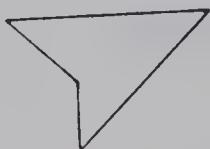
## HIDDEN FIGURES TEST V

Each problem in this test is made up of two designs, a complicated figure on the first page and a simple figure on the next. In each problem the simple design is contained in the complicated design. You are to find where the simple design is contained in the larger design and sketch it in over the lines of the figure.

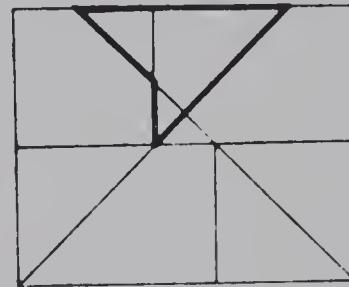
Here is an example of a complicated figure, a simple figure, and the complicated figure shown again with the simple figure sketched in.



complicated figure



simple figure



simple figure  
sketched in

The smaller figure is always present in the larger figure and always in the upright position. Be sure the figure you find is exactly the same as the simple figure, both in size and proportions. Work carefully and as systematically as you can. If you feel that you cannot solve one of the figures, you may skip it and come back to it later if you have time, but you will waste time if you keep skipping from figure to figure. Do not worry about erasing completely if you have one or two incorrect lines, but be sure that you have all the correct ones clearly indicated.



## APPENDIX I



## RELIGIOUS ORIENTATION SCALE

The following items deal with various types of religious ideas and social opinions. We should like to find out how common they are.

For each of the twenty items, please indicate the response you prefer. Record your choice by marking in the appropriate space on the answer sheet.

If none of the choices expresses exactly how you feel, then indicate the one which is closest to your own views. If no choice is possible, you may omit the item.

There are no "right" or "wrong" choices. There will be many religious people who will agree with all the possible answers.

1. A primary reason for my interest in religion is that my church is a congenial social activity.
  - a. definitely not true of me
  - b. tends not to be true
  - c. tends to be true
  - d. definitely true of me
- \*2. Religion is especially important to me because it answers many questions about the meaning of life.
  - a. definitely disagree
  - b. tend to disagree
  - c. tend to agree
  - d. definitely agree
3. One reason for my being a church member is that such membership helps to establish a person in the community.
  - a. definitely not true
  - b. tends not to be true



- c. tends to be true
  - d. definitely true
- \*4. The prayers I say when I am alone carry as much meaning and personal emotion as those said by me during services.
- a. almost never
  - b. sometimes
  - c. usually
  - d. almost always
5. Although I believe in my religion, I feel there are many more important things in my life.
- a. I definitely disagree
  - b. I tend to disagree
  - c. I tend to agree
  - c. I definitely agree
6. It doesn't matter so much what I believe so long as I lead a moral life.
- a. I definitely disagree
  - b. I tend to disagree
  - c. I tend to agree
  - d. I definitely agree
- \*7. It is important to me to spend periods of time in private religious thought and meditation.
- a. frequently true
  - b. occasionally true
  - c. rarely true
  - d. never true



8. What religion offers me most is comfort when sorrows and misfortune strike.
- I definitely disagree
  - I tend to disagree
  - I tend to agree
  - I definitely agree
- \*9. My religious beliefs are what really lie behind my whole approach to life.
- this is definitely not so
  - probably not so
  - probably so
  - definitely so
10. The church is most important as a place to formulate good social relationships.
- I definitely disagree
  - I tend to disagree
  - I tend to agree
  - I definitely agree
11. The primary purpose of prayer is to gain relief and protection.
- I definitely agree
  - I tend to agree
  - I tend to disagree
  - I definitely disagree
- \*12. If not prevented by unavoidable circumstances, I attend church:
- more than once a week
  - about once a week
  - two or three times a month
  - less than once a month



13. The purpose of prayer is to secure a happy and peaceful life.

- a. I definitely disagree
- b. I tend to disagree
- c. I tend to agree
- d. I definitely agree

\*14. I read literature about my faith (or church).

- a. frequently
- b. occasionally
- c. rarely
- d. never

\*15. Quite often I have been keenly aware of the presence of God or the Divine Being.

- a. definitely not true
- b. tends not to be true
- c. tends to be true
- d. definitely true

16. Although I am a religious person I refuse to let religious considerations influence my everyday affairs.

- a. definitely not true of me
- b. tends not to be true
- c. tends to be true
- d. clearly true in my case.

17. Occasionally I find it necessary to compromise my religious beliefs in order to protect my social and economic well-being.

- a. definitely disagree
- b. tend to disagree
- c. tend to agree
- d. definitely agree



\*18. If I were to join a church group I would prefer to join  
(1) a Bible Study group or (2) a social fellowship.

- a. I would prefer to join (1)
- b. I probably would prefer (1)
- c. I probably would prefer (2)
- d. I would prefer to join (2)

19. I pray chiefly because I have been taught to pray.

- a. definitely true of me
- b. tends to be true
- c. tends not to be true
- d. definitely not true of me

\*20. I try hard to carry my religion over into all my other dealings in life.

- a. I definitely disagree
- b. I tend to disagree
- c. I tend to agree
- d. I definitely agree

\* Intrinsic items.



## APPENDIX J



INTERNAL-EXTERNAL SCALE

Below are 25 pairs of statements, lettered A and B respectively. Select the one statement of each pair (and only one) which you more strongly believe to be true, and circle the letter of the statement.

There is no time limit, but work as quickly as you can. Have you any questions?

---

1.     A.\* Many of the unhappy things in people's lives are partly due to bad luck.  
      B.    People's misfortunes result from the mistakes they make.
2.     A.    One of the major reasons we have wars is because people don't take enough interest in politics.  
      B.\* There will always be wars, no matter how hard people try to prevent them.
3.     A.    In the long run, people get the respect they deserve in this world.  
      B.\* Unfortunately, an individual's worth often passes unrecognized, no matter how hard he tries.
4.     A.    The idea that teachers are unfair to students is nonsense.  
      B.\* Most students don't recognize the extent to which their grades are influenced by accidental happenings.
5.     A.\* Without the right breaks, one cannot be an effective leader.  
      B.    Capable people who fail to become leaders have not taken advantage of their opportunities.
6.     A.    There are certain people who are just no good.  
      B.\* There is some good in everybody.
7.     A.\* I have often found out that what is going to happen will happen anyway.  
      B.    Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
8.     A.\* No matter how hard you try, some people just don't like you.  
      B.    People who can't get others to like them don't understand how to get along with others.



9. A. In the case of the well-prepared student, there is rarely if ever such a thing as an unfair test.
- B\* Many times exam questions are so unrelated to the course that studying is really useless.
10. A. Becoming a success is a matter of hard work; luck has nothing to do with it.
- B.\* Getting a good job depends mainly on being in the right place at the right time.
11. A. When I make plans, I am almost certain that I can make them work.
- B.\* It is not always wise to plan too far ahead, because many things turn out to be a matter of good or bad fortune, anyhow.
12. A. In my case, getting what I want has little or nothing to do with luck.
- B.\* Many times we might just as well decide what to do by flipping a coin.
13. A. One should always be willing to admit mistakes.
- B. It is usually best to cover up one's mistakes.
14. A.\* Who gets to be boss often depends on who was lucky enough to be in the right place first.
- B. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
15. A.\* As far as world affairs are concerned, most of us are the victims of forces we can neither understand nor control.
- B. By taking an active part in political and social affairs, the people can control world events.
16. A.\* Most people just don't realize the extent to which their lives are controlled by accidental happenings.
- B. There is really no such thing as "luck".
17. A.\* It is hard to know whether or not a person really likes you.
- B. How many friends you have depends on how nice a person you are.
18. A.\* In the long run, the bad things that happen to us are balanced by the good things.



18. B. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
19. A. With enough effort we can wipe out political corruption.  
B.\* It is difficult for people to have much control over the things politicians do in office.
20. A.\* Sometimes I can't understand how teachers arrive at the grades they give.  
B. There is a direct connection between how hard I study and the grades I get.
21. A. There is too much emphasis on athletics in high school.  
B. Team sports are an excellent way to build character.
22. A.\* Many times I feel that I have little influence over the things that happen to me.  
B. It is impossible for me to believe that chance or luck plays an important role in my life.
23. A. People are lonely because they don't try to be friendly.  
B.\* There's not much use trying too hard to please people; if they like you, they like you.
24. A. What happens to me is the result of my own doing.  
B.\* Sometimes I feel that I don't have enough control over the direction my life is taking.
25. A.\* Most of the time I can't understand why politicians behave the way they do.  
B. In the long run, the people are responsible for bad government on a national as well as on a local level.

\* External choices.

Note: items 6, 13, and 21 are filler items and not scored.



## APPENDIX K



CONCEPTUAL SYSTEMS TEST

Please indicate the extent to which you agree or disagree with each of the following statements by marking an "X" in the appropriate place on the 6-point scale on the answer sheet. There is no time limit. Have you any questions?

1. I believe that to attain my goals it is only necessary for me to live as God would have me live.
2. I like to have a place for everything and everything in its place.
3. Any written work that I do I like to have precise, neat and well organized.
4. I like my friends to confide in me and to tell me their troubles.
5. I like to join clubs or social groups.
6. I like to make as many friends as I can.
7. I feel like telling other people off when I disagree with them.
8. These days a person doesn't really know whom he can count on.
9. In the final analysis events in the world will ultimately be in line with the master plan of God.
10. I like to keep my things neat and orderly on my desk or workspace.
11. I don't like for things to be uncertain and unpredictable.
12. I always like for other people to tell me their problems.
13. I enjoy very much being a part of a group.
14. I like to form new friendships.
15. I feel like getting revenge when someone has insulted me.
16. You sometimes can't help wondering whether anything's worthwhile anymore.
17. The way to peace in the world is through religion.
18. I like to have my work organized and planned before beginning it.
19. I find that a well organized mode of life with regular hours is suitable to my personality.
20. I like to help my friends when they are in trouble.



21. I like to meet new people.
22. I am a very sociable person who gets along easily with nearly everyone.
23. I feel like making fun of people who do things that I regard as stupid.
24. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
25. Guilt results from violation of God's law.
26. I like to keep my letters, bills, and other papers neatly arranged and filed according to some system.
27. I like to have my meals organized and a definite time set aside for eating.
28. Contributing to human welfare is the most satisfying human endeavor.
29. I feel at home with almost everyone and like to participate in what they are doing.
30. I like to criticize people who are in a position of authority.
31. Anyone who completely trusts anyone else is asking for trouble.
32. Marriage is the divine institution for the glorification of God.
33. I like to have my life so arranged that it runs smoothly and without much change in my plans.
34. I like to help other people who are less fortunate than I am.
35. I like to start conversations.
36. Politicians have to bribe people.
37. No man can be fully successful in life without belief or faith in divine guidance.
38. I like to plan and organize the details of any work that I undertake.
39. I like to treat other people with kindness and sympathy.
40. I like to give lots of parties.
41. Most people can still be depended upon to come through in a pinch.
42. Sin is a cultural concept built by man.



43. I like to sympathize with my friends when they are hurt or sick.
44. I prefer to do things alone, rather than with my friends.
45. The dictates of one's religion should be followed with trusting faith.
46. I enjoy making sacrifices for the sake of the happiness of others.
47. I think I have more friends than most people I know.
48. There are some things which God will never permit man to know.
49. I like to do things with my friends rather than by myself.



## ITEMS CONSTITUTING THE VARIOUS SUBTESTS OF THE CST

I. Divine Fate ControlItem No.

1	32	48
9	37	
17	42	
25	45	

II. Need for Structure OrderItem No.

2	18	33
3	19	38
10	26	
11	27	

III. Need to Help PeopleItem No.

4	34
12	39
20	43
28	46

IV. Need for PeopleItem No.

5	21	40
6	22	44
13	29	47
14	35	49

V. Interpersonal AggressionItem No.

7
15
23
30

VI. General Pessimism (Anomie)Item No.

8	36
16	41
24	
31	



SCORING THE CONCEPTUAL SYSTEMS TEST

Each item of the CST was assigned a score from 1 for "Strongly Disagree" to 6 for "Strongly Agree." Items 42 and 44 were scored from 6 to 1. The means for the six subtests were obtained and compared with the cutting points given below to determine the subject's system classification.

System 1 subjects were those who scored above 4.19 on the Divine Fate Control subtest.

System 2 subjects were those who scored as follows:

less than or equal to 4.19 on Divine Fate Control;  
greater than 3.74 on Interpersonal Aggression; and  
greater than 3.39 on General Pessimism.

System 3 subjects were those whose score pattern was:

less than or equal to 4.19 on Divine Fate Control;  
less than or equal to 3.75 on Interpersonal Aggression;  
and greater than 4.10 on Need for People.

System 4 subjects were those whose score pattern was:

less than or equal to 4.19 on Divine Fate Control;  
less than or equal to 4.10 on Need for Structure-Order;  
less than or equal to 4.10 on Need for People; and  
less than or equal to 3.75 on Interpersonal Aggression.



## APPENDIX L



AGREEMENT RESPONSE SCALE

Please indicate the extent to which you agree or disagree with each of the following statements by marking an "X" in the appropriate place on the answer sheet. There is no time limit.

1. Let us eat, drink and be merry, for tomorrow we die.
2. I tend to make decisions on the spur of the moment.
3. There are few things more satisfying than really to splurge on something -- books, clothes, furniture, etc.
4. Here today, gone tomorrow -- that's my motto!
5. Novelty has a great appeal to me.
6. My feelings about others fluctuate a good deal.
7. Conscience is another name for fear.
8. Movement, travel, change, excitement -- that's the life for me.
9. I'm apt to really blow up, but it doesn't last long.
10. It's great fun just to mess around.
11. There's nothing so satisfying as really to tell someone off.
12. I really enjoy plenty of excitement.
13. One should not give free reign to the passions, but rather control and weigh them before expressing them.
14. I seldom, if ever lose my temper.
15. Uncontrolled impulsiveness is not part of my makeup.
16. It's hard to get me upset.
17. My speech is quite slow and deliberate.
18. I feel uncomfortable when people get too emotional.
19. I almost never respond impulsively to people or events.



AGREEMENT RESPONSE SCALE -- ANSWER SHEET

Mark the extent of your agreement or disagreement with each item by putting an "X" under the appropriate response.

- 3 I strongly disagree
  - 2 I disagree
  - 1 I slightly disagree
  - 0 No response
  - +1 I slightly agree
  - +2 I agree
  - +3 I strongly agree

Item No.	-3	-2	-1	0	+1	+2	+3
1	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—
3	—	—	—	—	—	—	—
4	—	—	—	—	—	—	—
5	—	—	—	—	—	—	—
6	—	—	—	—	—	—	—
7	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—
11	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—
16	—	—	—	—	—	—	—
17	—	—	—	—	—	—	—
18	—	—	—	—	—	—	—
19	—	—	—	—	—	—	—



## **APPENDIX M**



PROCEDURE FOR CONDUCTING SET TESTS

A. Fixation of set in the haptic modality.

The subject was seated with hands resting on the thighs and palms upward. The subject was blindfolded and the following instructions were then given:

I am going to present two spheres to you, one in each hand. You may grasp them for a moment and then I shall remove them. I shall repeat this a number of times. Each time I do this, please tell me if the spheres feel equal or unequal in size. If you think that they are unequal in size, tell me in which hand you feel the larger one. Please be sure to tell me each time I do this.

Following this, the two spheres of unequal size were placed in the palms, one in each palm with the larger sphere placed in the right palm (setting tests). The subject was allowed to grasp the spheres and then they were removed. The unequal spheres were presented twice and then the test for set was made. This was done by presenting the two equal spheres without informing the subject (critical tests). If they appeared unequal a set had been fixated. If no fixation appeared (that is, they felt equal in size), then the setting trials were resumed. Critical trials subsequently were made after the 5th, 10th, 15th, and 20th setting trial until a set had been fixated or a minimum of 25 setting trials. The verbal response given after each trial was recorded. Part B then followed.

B. Extinction of set in the haptic modality.

When the subject perceived the two equal spheres as unequal a set had been established. To extinguish, the critical trials (presentation of the equal spheres) were continued until the spheres were perceived veridically for five consecutive trials or a maximum of 40 critical trials. The response after each critical trial was recorded.



## SET (HAPTIC MODALITY) SCORING SHEET

EXCITATION				EXTINCTION				
1	L	R	E	1	L	R	E	
2	L	R	E	2	L	R	E	
*	3	L	R	E	3	L	R	E
4	L	R	E	4	L	R	E	
5	L	R	E	5	L	R	E	
6	L	R	E	6	L	R	E	
*	7	L	R	E	7	L	R	E
8	L	R	E	8	L	R	E	
9	L	R	E	9	L	R	E	
10	L	R	E	10	L	R	E	
11	L	R	E	11	L	R	E	
12	L	R	E	12	L	R	E	
*	13	L	R	E	13	L	R	E
14	L	R	E	14	L	R	E	
15	L	R	E	15	L	R	E	
16	L	R	E	16	L	R	E	
17	L	R	E	17	L	R	E	
18	L	R	E	18	L	R	E	
*	19	L	R	E	19	L	R	E
20	L	R	E	20	L	R	E	
21	L	R	E	21	L	R	E	
22	L	R	E	22	L	R	E	
23	L	R	E	23	L	R	E	
24	L	R	E	24	L	R	E	
*	25	L	R	E	25	L	R	E
* Critical tests.				26	L	R	E	
				27	L	R	E	
				28	L	R	E	
				29	L	R	E	
				30	L	R	E	
				31	L	R	E	
				32	L	R	E	
				33	L	R	E	
				34	L	R	E	
				35	L	R	E	
				36	L	R	E	
				37	L	R	E	
				38	L	R	E	
				39	L	R	E	
				40	L	R	E	

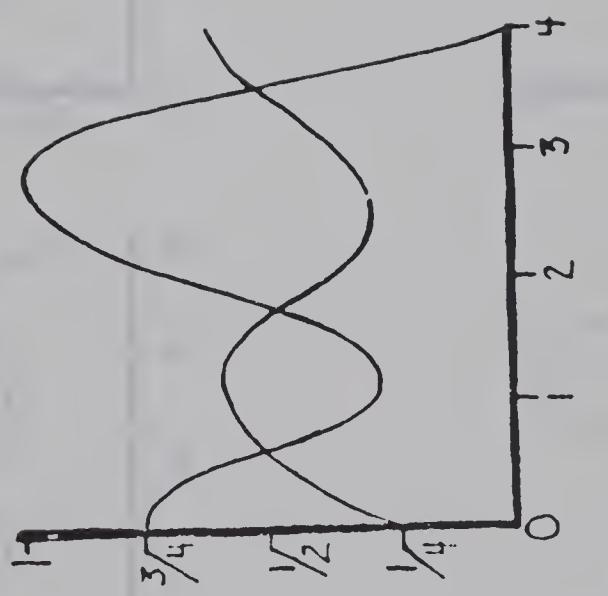
NOTE: If 5 consecutive trials  
judged equal -- set  
extinct.



APPENDIX N

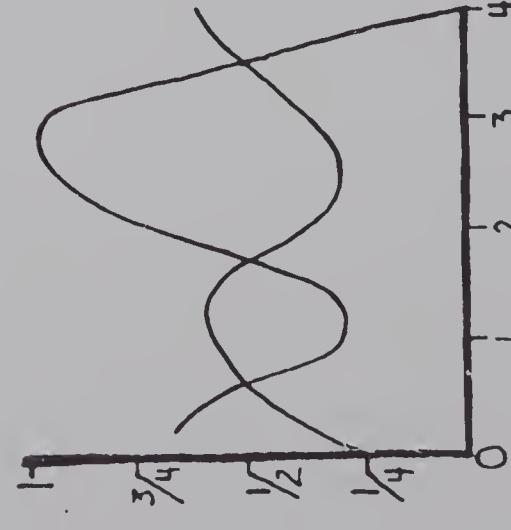
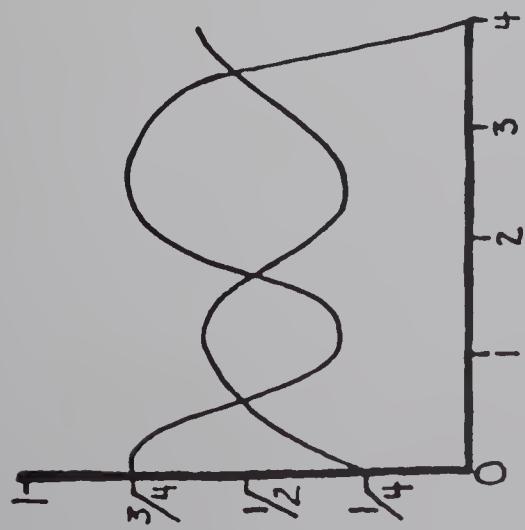
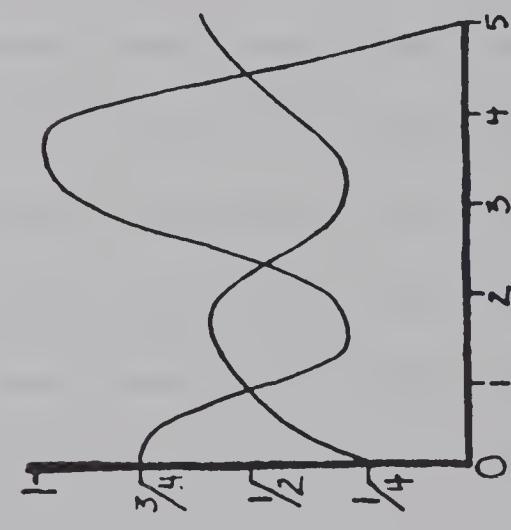
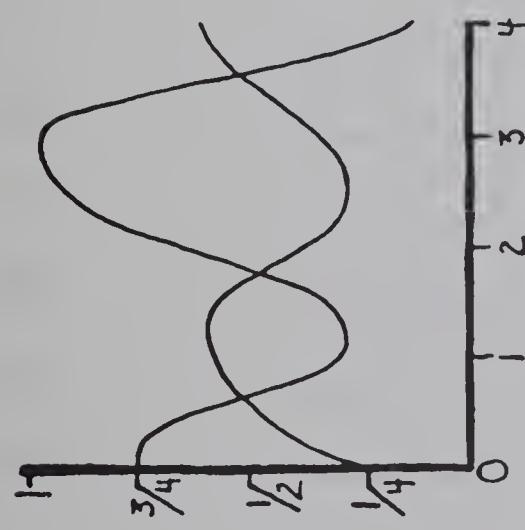
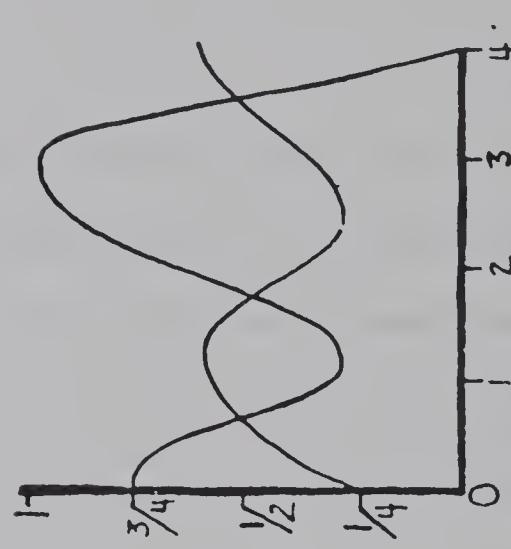
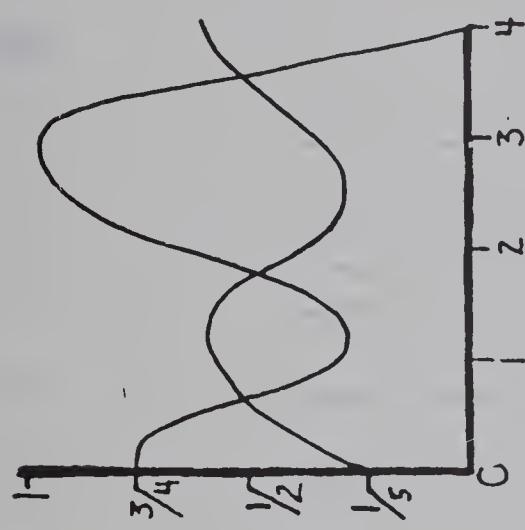
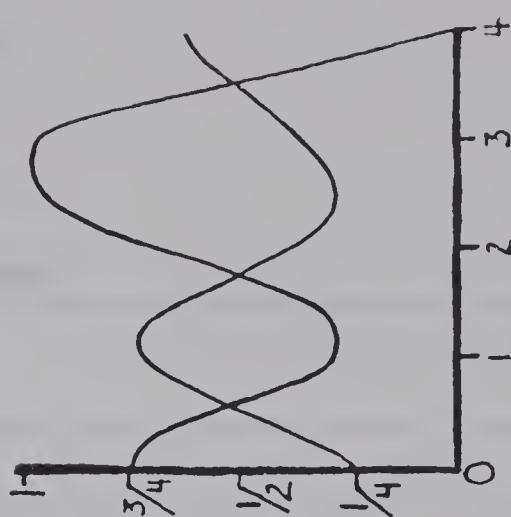
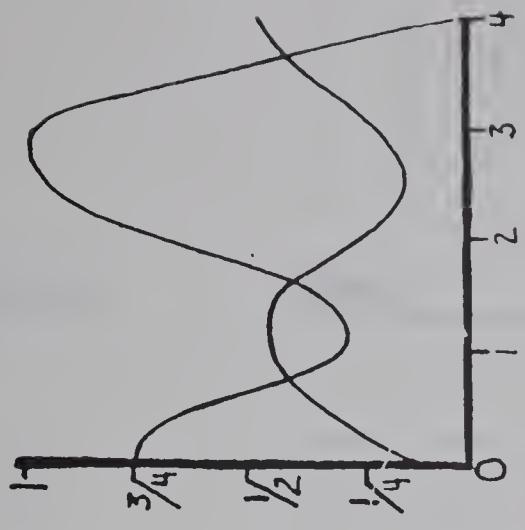


MATCHING FAMILIAR FIGURES  
(ADULT VERSION)



STANDARD

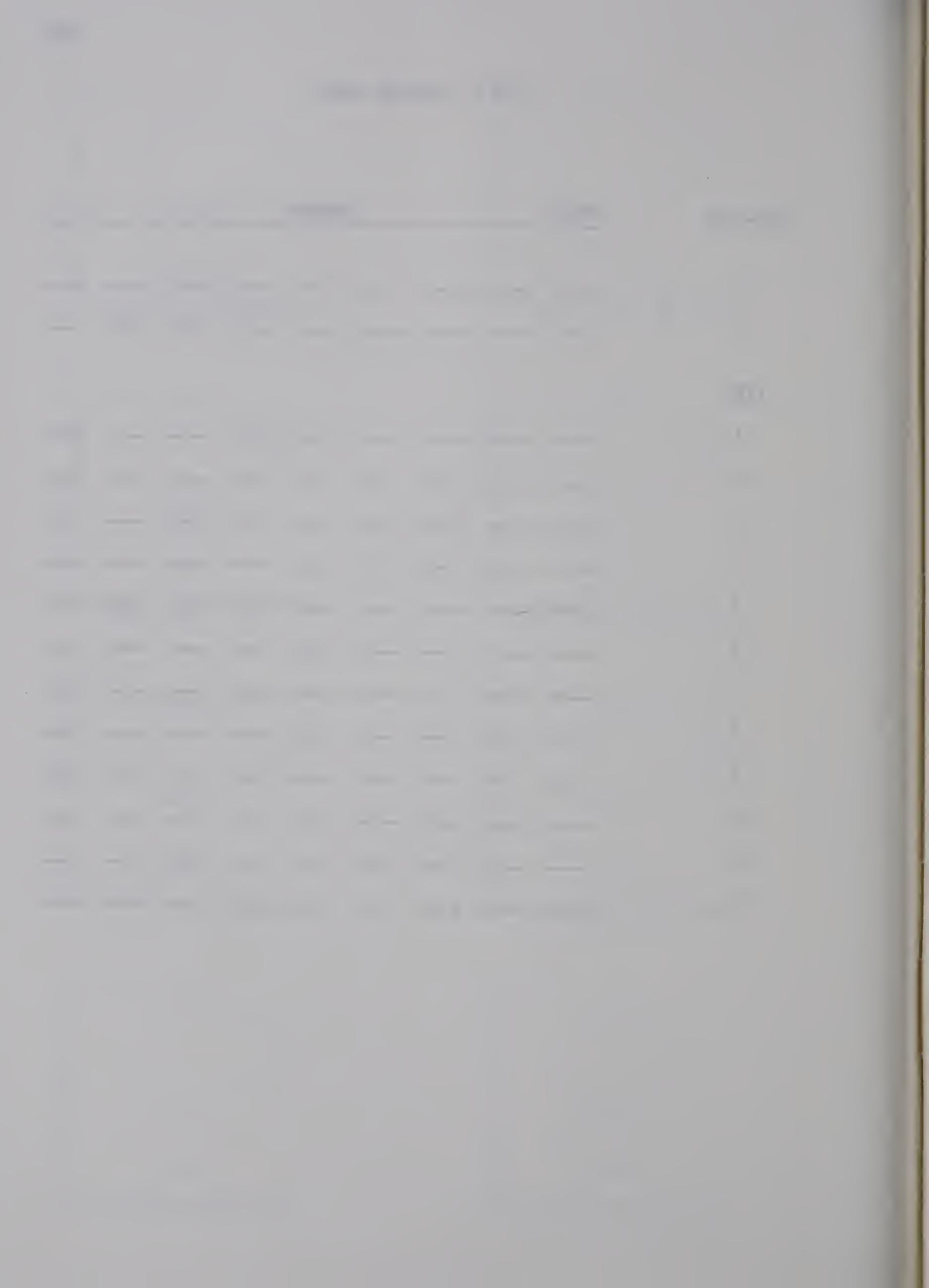






## M.F.F. SCORING SHEET

<u>PRACTICE</u>	<u>TIME</u>	<u>ERRORS</u>
1	—	—
2	—	—
<u>ITEM</u>		
1	—	—
2	—	—
3	—	—
4	—	—
5	—	—
6	—	—
7	—	—
8	—	—
9	—	—
10	—	—
11	—	—
12	—	—





**B29935**